

|                                                                                      |                    |                                |
|--------------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                                      | 6.4 T              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                              | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000X11026X |
| <b>Title:</b> AXLE AND DIFFERENTIAL: AXLE SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S) |                    |                                |

## PROBLEM SYMPTOMS TABLE

### HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

### Axle System

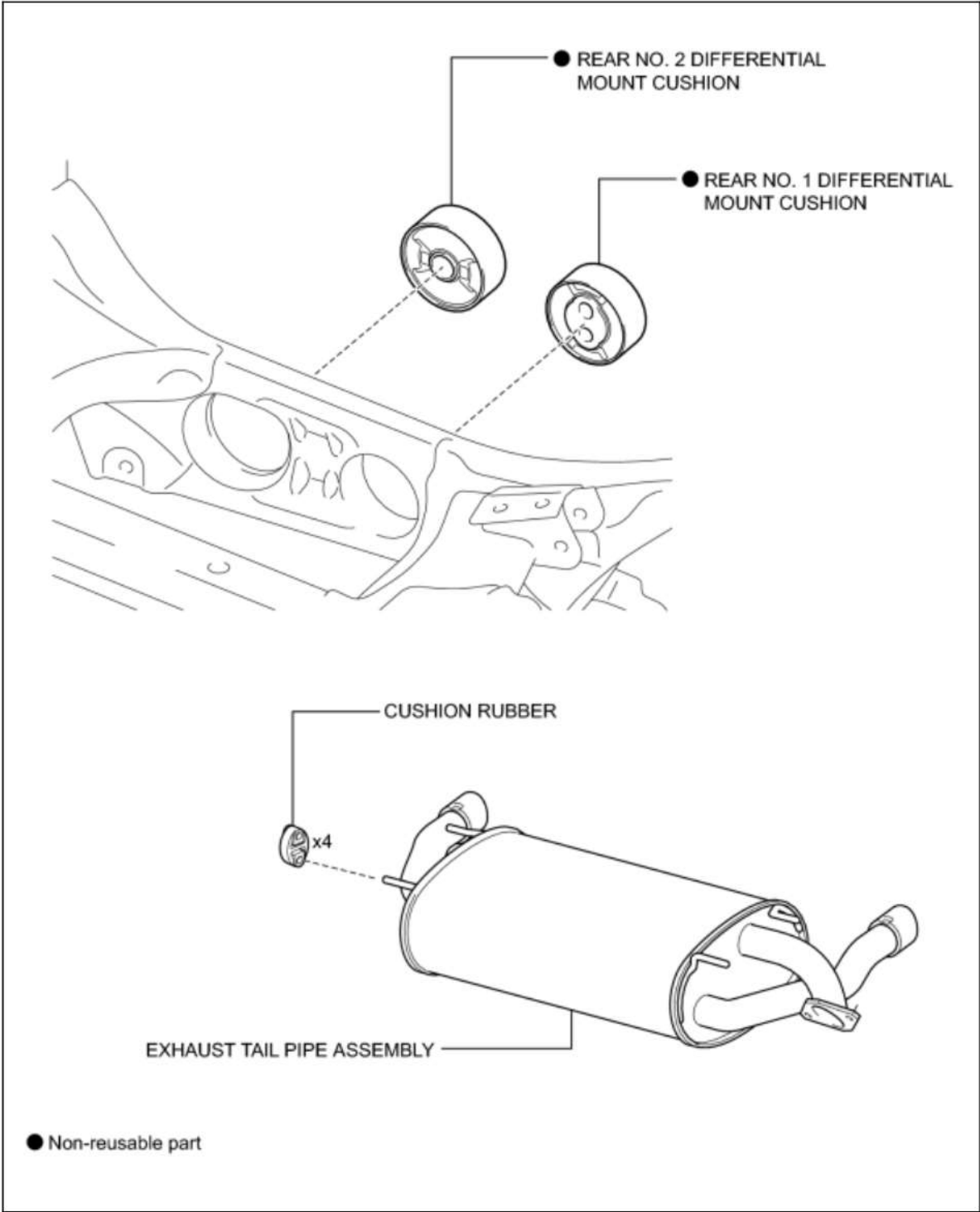
| SYMPTOM            | SUSPECTED AREA                        | SEE PAGE             |
|--------------------|---------------------------------------|----------------------|
| Wander/pulls       | Tires (Worn or improperly inflated)   | <a href="#">INFO</a> |
|                    | Front wheel alignment (Incorrect)     | <a href="#">INFO</a> |
|                    | Rear wheel alignment (Incorrect)      | <a href="#">INFO</a> |
|                    | Steering linkage (Loose or worn)      | <a href="#">INFO</a> |
|                    | Front hub bearings (Loose or worn)    | <a href="#">INFO</a> |
|                    | Front stabilizer bar (Bend or breach) | <a href="#">INFO</a> |
| Front wheel shimmy | Wheels (Out of balance)               | <a href="#">INFO</a> |
|                    | Front Shock absorber (Worn)           | <a href="#">INFO</a> |
|                    | Wheel alignment (Incorrect)           | <a href="#">INFO</a> |
|                    | Lower ball joint (Worn)               | <a href="#">INFO</a> |
|                    | Hub bearings (Loose or worn)          | <a href="#">INFO</a> |
| Front wheel shimmy | Wheel alignment (Incorrect)           | <a href="#">INFO</a> |
|                    | Lower ball joint (Worn)               | <a href="#">INFO</a> |
|                    | Hub bearings (Loose or worn)          | <a href="#">INFO</a> |
|                    | Front Shock absorber (Worn)           | <a href="#">INFO</a> |
| Rear wheel shimmy  | Hub bearings (Loose or worn)          | <a href="#">INFO</a> |
|                    | Shock absorber (Worn)                 | <a href="#">INFO</a> |



|                                                                                  |             |                         |
|----------------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                         | 6.4 K       | From: 201203            |
| Model Year: 2013                                                                 | Model: FR-S | Doc ID: RM000001V2R00VX |
| Title: AXLE AND DIFFERENTIAL: DIFFERENTIAL MOUNT CUSHION: COMPONENTS (2013 FR-S) |             |                         |

COMPONENTS

ILLUSTRATION

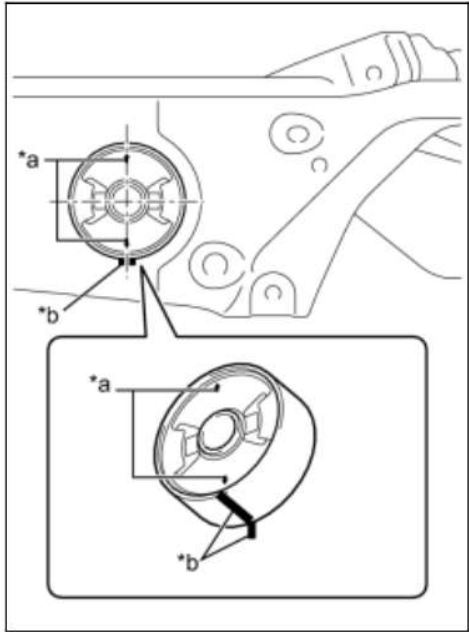


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|                                                                                    |             |                         |
|------------------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                           | 6.4 A       | From: 201203            |
| Model Year: 2013                                                                   | Model: FR-S | Doc ID: RM000000TLO02FX |
| Title: AXLE AND DIFFERENTIAL: DIFFERENTIAL MOUNT CUSHION: INSTALLATION (2013 FR-S) |             |                         |

INSTALLATION

1. INSTALL REAR NO. 2 DIFFERENTIAL MOUNT CUSHION



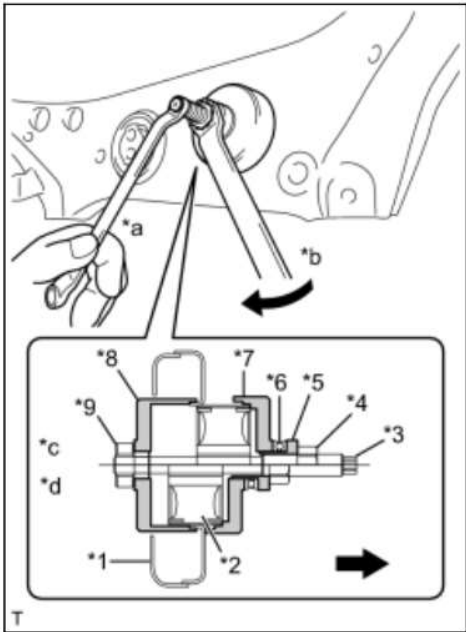
(a) Put matchmarks on rear suspension member and new rear No. 2 differential mount cushion.

Text in Illustration

|    |           |
|----|-----------|
| *a | Arrow     |
| *b | Matchmark |

**CAUTION:**  
Install the rear No. 2 differential mount cushion with the arrow marks facing upward and downward.

(b) Using SST and install the rear No. 2 differential mount cushion.



**SST: 09570-18010**

09571-01030

09571-01040

09571-01050

09571-01060

09571-01070

09571-01080

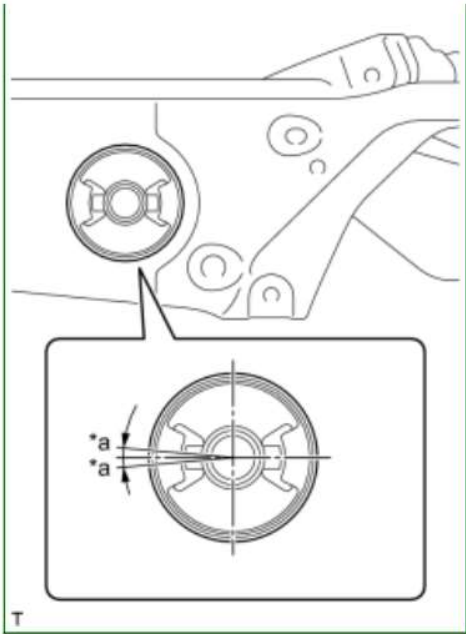
09571-01090

**Text in Illustration**

|                                                                                     |                                       |
|-------------------------------------------------------------------------------------|---------------------------------------|
| *1                                                                                  | Rear Suspension Member                |
| *2                                                                                  | Rear No. 2 Differential Mount Cushion |
| *3                                                                                  | SST(09571-01090)                      |
| *4                                                                                  | SST(09571-01070)                      |
| *5                                                                                  | SST(09571-01050)                      |
| *6                                                                                  | SST(09571-01080)                      |
| *7                                                                                  | SST(09571-01040)                      |
| *8                                                                                  | SST(09571-01030)                      |
| *9                                                                                  | SST(09571-01060)                      |
| *a                                                                                  | Hold                                  |
| *b                                                                                  | Turn                                  |
| *c                                                                                  | Start                                 |
| *d                                                                                  | End                                   |
|  | Front side                            |

**HINT:**

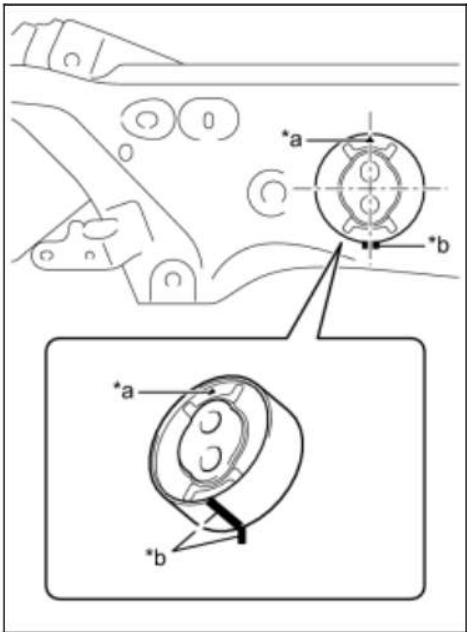
- Install the rear No. 2 differential mount cushion while aligning with the matchmark on the rear suspension member and checking misalignment.
- Push in the rear No. 2 differential mount cushion until SST (09571-01040) comes into contact with the rear suspension member.
- Make sure that the differential mount cushion is aligned within 5° from the center.



Text in Illustration

|    |    |
|----|----|
| *a | 5° |
|----|----|

2. INSTALL REAR NO. 1 DIFFERENTIAL MOUNT CUSHION



(a) Put matchmarks on rear suspension member and new rear No. 1 differential mount cushion.

Text in Illustration

|    |               |
|----|---------------|
| *a | Triangle Mark |
| *b | Matchmark     |

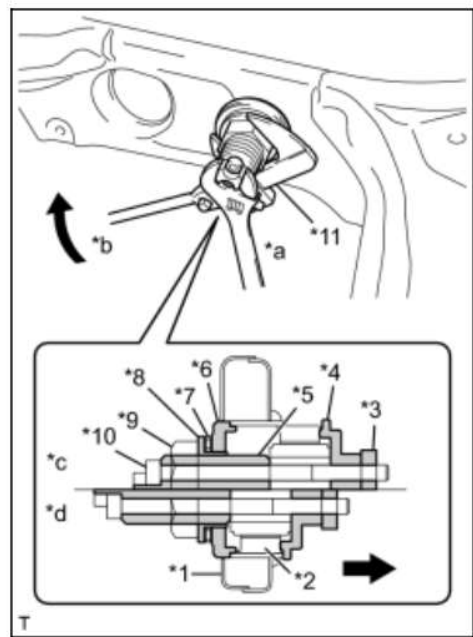
**NOTICE:**  
Install the rear No. 1 differential mount cushion with the triangle mark facing upward.

(b) Using SST and install the rear No. 1 differential mount cushion.

**SST: 09570-18020**

- 09571-01120
- 09571-01130
- 09571-01140
- 09571-01150
- 09571-01160

09571-01170  
09571-01180  
09571-01190  
**SST: 09922-10010**



Text in Illustration

|                                                                                     |                                       |
|-------------------------------------------------------------------------------------|---------------------------------------|
| *1                                                                                  | Rear Suspension Member                |
| *2                                                                                  | Rear No. 1 Differential Mount Cushion |
| *3                                                                                  | SST(09571-01150)                      |
| *4                                                                                  | SST(09571-01130)                      |
| *5                                                                                  | SST(09571-01190)                      |
| *6                                                                                  | SST(09571-01120)                      |
| *7                                                                                  | SST(09571-01170)                      |
| *8                                                                                  | SST(09571-01140)                      |
| *9                                                                                  | SST(09571-01160)                      |
| *10                                                                                 | SST(09571-01180)                      |
| *11                                                                                 | SST(09922-10010)                      |
| *a                                                                                  | Hold                                  |
| *b                                                                                  | Turn                                  |
| *c                                                                                  | Start                                 |
| *d                                                                                  | End                                   |
|  | Front side                            |

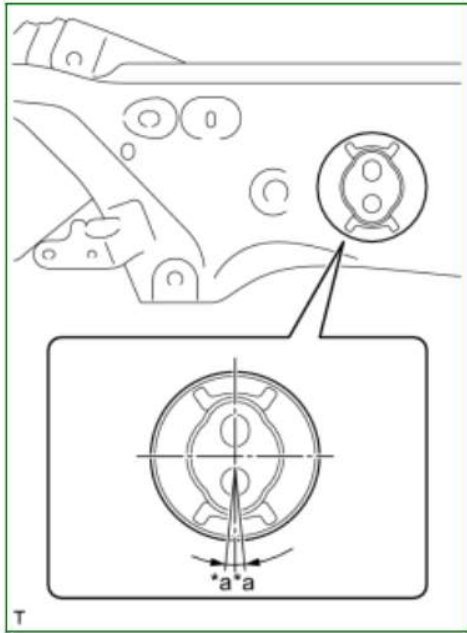
- NOTICE:**
- Install the rear No. 1 differential mount cushion while checking that SST and the rear No. 1

differential mount cushion are not at an angle.

- If the rear No. 1 differential mount cushion is pushed in at an angle, the installation becomes difficult. Be sure to set SST on the rear No. 1 differential mount cushion with no clearance.

#### HINT:

- Install the rear No. 1 differential mount cushion while aligning with the matchmark on the rear suspension member and checking misalignment.
- Push in the rear No. 1 differential mount cushion until SST (09571-01130) comes into contact with the rear suspension member.
- Make sure that the differential mount cushion is aligned within 3° from the center.



Text in Illustration

|    |    |
|----|----|
| *a | 3° |
|----|----|

### 3. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

### 4. INSTALL REAR STABILIZER BAR

INFO

### 5. INSTALL EXHAUST TAIL PIPE ASSEMBLY

INFO

### 6. INSTALL DIFFERENTIAL CARRIER ASSEMBLY

INFO



|                                                                               |             |                         |
|-------------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                      | 6.4 A       | From: 201203            |
| Model Year: 2013                                                              | Model: FR-S | Doc ID: RM000000TLR02FX |
| Title: AXLE AND DIFFERENTIAL: DIFFERENTIAL MOUNT CUSHION: REMOVAL (2013 FR-S) |             |                         |

REMOVAL

1. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

2. REMOVE EXHAUST TAIL PIPE ASSEMBLY

INFO

3. REMOVE REAR STABILIZER BAR

INFO

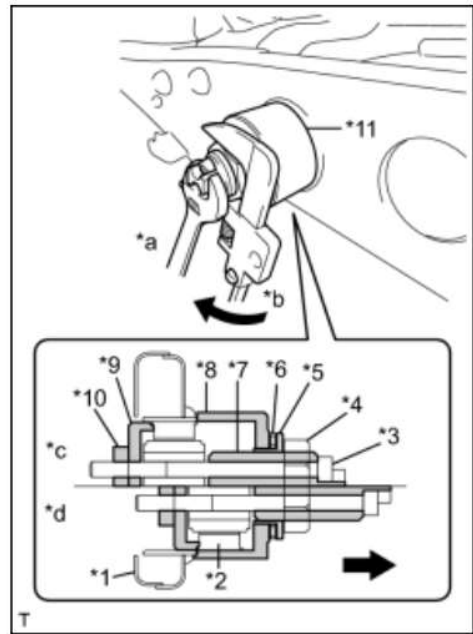
4. REMOVE REAR NO. 1 DIFFERENTIAL MOUNT CUSHION

(a) Using SST, remove the rear No. 1 differential mount cushion.

SST: 09570-18020

- 09571-01100
- 09571-01110
- 09571-01140
- 09571-01150
- 09571-01160
- 09571-01170
- 09571-01180
- 09571-01190

SST: 09922-10010



Text in Illustration

|    |                        |
|----|------------------------|
| *1 | Rear Suspension Member |
|----|------------------------|

|                                                                                   |                                       |
|-----------------------------------------------------------------------------------|---------------------------------------|
| *2                                                                                | Rear No. 1 Differential Mount Cushion |
| *3                                                                                | SST(09571-01180)                      |
| *4                                                                                | SST(09571-01160)                      |
| *5                                                                                | SST(09571-01140)                      |
| *6                                                                                | SST(09571-01170)                      |
| *7                                                                                | SST(09571-01190)                      |
| *8                                                                                | SST(09571-01110)                      |
| *9                                                                                | SST(09571-01100)                      |
| *10                                                                               | SST(09571-01150)                      |
| *11                                                                               | SST(09922-10010)                      |
| *a                                                                                | Hold                                  |
| *b                                                                                | Turn                                  |
| *c                                                                                | Start                                 |
| *d                                                                                | End                                   |
|  | Front side                            |

**NOTICE:**

- Make sure that SST does not come into contact with the cylindrical part of the rear suspension member and is not set at an angle.
- Make sure that SST does not run on the weld bead around the cylindrical part.

**5. REMOVE REAR NO. 2 DIFFERENTIAL MOUNT CUSHION**

(a) Using SST, remove the rear No. 2 differential mount cushion.

**SST: 09570-18010**

09571-01010

09571-01020

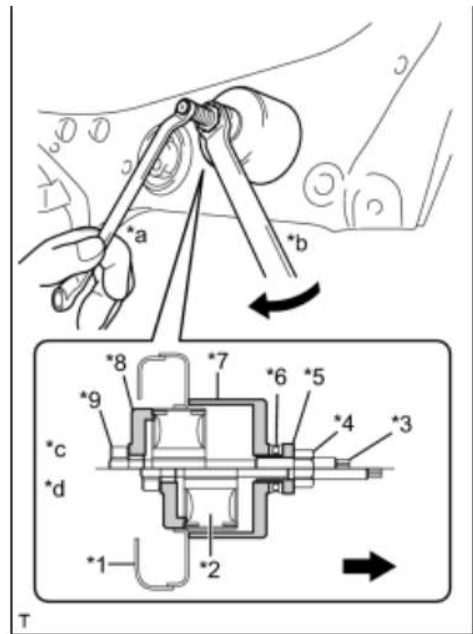
09571-01050

09571-01060

09571-01070

09571-01080

09571-01090



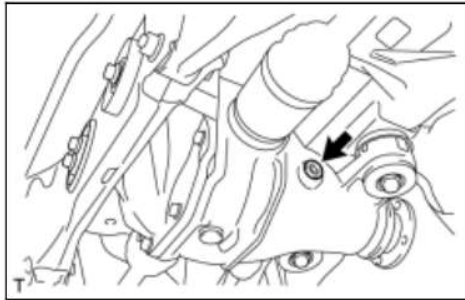
Text in Illustration

|                                                                                     |                                       |
|-------------------------------------------------------------------------------------|---------------------------------------|
| *1                                                                                  | Rear Suspension Member                |
| *2                                                                                  | Rear No. 2 Differential Mount Cushion |
| *3                                                                                  | SST(09571-01090)                      |
| *4                                                                                  | SST(09571-01070)                      |
| *5                                                                                  | SST(09571-01050)                      |
| *6                                                                                  | SST(09571-01080)                      |
| *7                                                                                  | SST(09571-01020)                      |
| *8                                                                                  | SST(09571-01010)                      |
| *9                                                                                  | SST(09571-01060)                      |
| *a                                                                                  | Hold                                  |
| *b                                                                                  | Turn                                  |
| *c                                                                                  | Start                                 |
| *d                                                                                  | End                                   |
|  | Front side                            |

|                                                                               |                    |                                |
|-------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                               | 6.4 N              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                       | <b>Model:</b> FR-S | <b>Doc ID:</b> RM0000009HK00DX |
| <b>Title:</b> AXLE AND DIFFERENTIAL: DIFFERENTIAL OIL: ADJUSTMENT (2013 FR-S) |                    |                                |

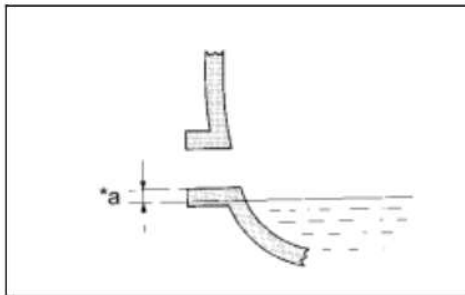
## ADJUSTMENT

### 1. INSPECT DIFFERENTIAL OIL LEVEL



- (a) Using a hexagon wrench 10 mm, remove the rear differential filler plug and gasket.

- (b) Check that the oil level is between 0 to 5 mm (0 to 0.197 in.) from the bottom lip of the rear differential filler plug opening.



#### Text in illustration

|    |                            |
|----|----------------------------|
| *a | 0 to 5 mm (0 to 0.197 in.) |
|----|----------------------------|

#### NOTICE:

- An excessively large or small amount of differential oil may cause damage.
- After replacing oil, drive the vehicle and check the oil level.

If necessary, fill the rear differential carrier assembly with differential synthetic gear oil.

- (c) Inspect for oil leaks if the oil level is low.  
 (d) Using a hexagon wrench 10 mm, install the rear differential filler plug and a new gasket.

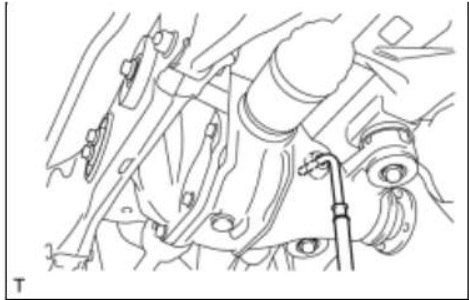
**Torque: 49 N·m (500 kgf·cm, 36ft·lbf)**

### 2. ADD DIFFERENTIAL OIL

- (a) Using a hexagon wrench 10 mm, remove the rear differential filler plug and gasket.

- (b) Add differential oil.

| Capacity | Oil Grade                                                                                               |
|----------|---------------------------------------------------------------------------------------------------------|
|          | <ul style="list-style-type: none"> <li>• Toyota genuine differential gear oil LT 75W-85 GL-5</li> </ul> |



|                                                                  |                                                                                                                                                              |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                  |                                                                                                                                                              |
| 1.10 to 1.20 liters (1.17 to 1.27 US qts, 0.97 to 1.05 Imp. qts) | or equivalent (except for LSD) <ul style="list-style-type: none"><li>• Toyota genuine differential gear oil LX 75W-85 GL-5 or equivalent (for LSD)</li></ul> |

- (c) Using a hexagon wrench 10 mm, install the rear differential filler plug together with a new gasket.
- Torque: 49 N·m (500 kgf·cm, 36ft·lbf)**

**NOTICE:**

- When adding differential oil, make sure that the vehicle is level.
- An excessively large or small amount of differential oil may cause damage.
- After adding differential oil, drive the vehicle and recheck the oil level.



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|                                                                                  |                    |                                |
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| <b>Last Modified:</b> 3-27-2012                                                  | 6.4 L              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                          | <b>Model:</b> FR-S | <b>Doc ID:</b> RM0000013SC00YX |
| <b>Title:</b> AXLE AND DIFFERENTIAL: DIFFERENTIAL SYSTEM: PRECAUTION (2013 FR-S) |                    |                                |

## **PRECAUTION**

- 1. Before disassembly, clean the outside of the rear differential carrier assembly and remove any sand or mud to prevent it from entering the inside of the rear differential carrier assembly during disassembly and installation.**
- 2. When removing a connected part made of light alloy such as a rear differential carrier cover, tap it off with a plastic-faced hammer. Do not attempt to pry it off with a screwdriver.**
- 3. Always arrange disassembled parts in order to protect them from dust.**
- 4. Before installation, thoroughly clean and dry each part, and then apply Toyota genuine differential gear oil LT 75W-85 GL-5 to those parts. Do not use alkaline cleaner for aluminum or rubber parts and ring gear set bolts. Also, do not clean rubber parts such as O-rings or oil seals with non-residue solvent (except LSD).**
- 5. Before installation, thoroughly clean and dry each part, and then apply Toyota genuine differential gear oil LX 75W-85 GL-5 to those parts. Do not use alkaline cleaner for aluminum or rubber parts and ring gear set bolts. Also, do not clean rubber parts such as O-rings or oil seals with non-residue solvent (for LSD).**
- 6. Coat sliding surfaces and rotating parts with Toyota genuine differential gear oil LT 75W-85 GL-5 (except LSD).**
- 7. Coat sliding surfaces and rotating parts with Toyota genuine differential gear oil LX 75W-85 GL-5 (for LSD).**
- 8. When holding a part in a vise, be sure to place an aluminum sheet between the part and vise. Do not put the part directly in the vise.**
- 9. Do not damage the contact surfaces of the rear differential carrier. Such damage may cause oil leakage.**
- 10. Do not fill the differential with oil immediately after parts have been installed using seal packing. Allow at least 1 hour for the seal packing to dry before filling the differential.**
- 11. Damage to surfaces in contact with an oil seal, O-ring or gasket may cause oil leakage.**
- 12. When press-fitting an oil seal, do not damage the oil seal lip or outside periphery.**
- 13. When replacing a bearing, replace the inner and outer races as a set.**



|                                                                                              |                    |                                |
|----------------------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                                              | 6.4 T              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                                      | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000001RFE016X |
| <b>Title:</b> AXLE AND DIFFERENTIAL: DIFFERENTIAL SYSTEM: PROBLEM SYMPTOMS TABLE (2013 FR-S) |                    |                                |

## PROBLEM SYMPTOMS TABLE

### HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

### Differential System

| SYMPTOM                         | SUSPECTED AREA                                               | SEE PAGE             |
|---------------------------------|--------------------------------------------------------------|----------------------|
| Noise in rear differential      | Oil (Level low or wrong grade)                               | <a href="#">INFO</a> |
|                                 | Ring gear or drive pinion (Worn or chipped)                  | <a href="#">INFO</a> |
|                                 | Backlash adjustment (Incorrect)                              | <a href="#">INFO</a> |
|                                 | Preload adjustment (Incorrect)                               | <a href="#">INFO</a> |
|                                 | Tooth contact between ring gear and drive pinion (Incorrect) | <a href="#">INFO</a> |
|                                 | Bearing (Worn)                                               | <a href="#">INFO</a> |
| Oil leak from rear differential | Oil (Level too high or wrong grade)                          | <a href="#">INFO</a> |
|                                 | Side gear shaft oil seal (Worn or damaged)                   | <a href="#">INFO</a> |
|                                 | Carrier oil seal (Worn or damaged)                           | <a href="#">INFO</a> |

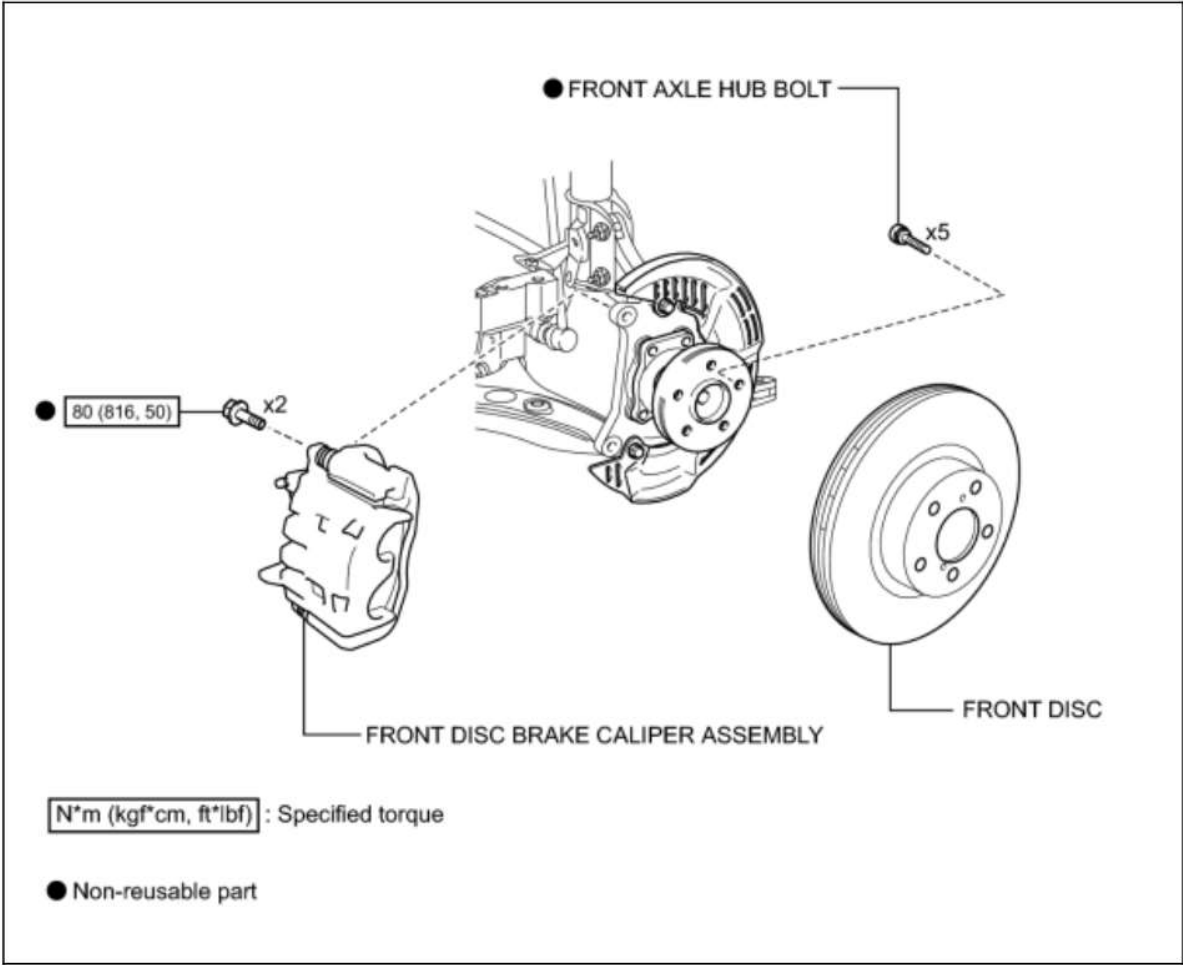


TOYOTA

|                                                                           |             |                         |
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| Last Modified: 3-27-2012                                                  | 6.4 K       | From: 201203            |
| Model Year: 2013                                                          | Model: FR-S | Doc ID: RM000000V7F01AX |
| Title: AXLE AND DIFFERENTIAL: FRONT AXLE HUB BOLT: COMPONENTS (2013 FR-S) |             |                         |

COMPONENTS

ILLUSTRATION



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|                                                                            |             |                         |
|----------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                   | 6.4 A       | From: 201203            |
| Model Year: 2013                                                           | Model: FR-S | Doc ID: RM000000V7G01UX |
| Title: AXLE AND DIFFERENTIAL: FRONT AXLE HUB BOLT: REPLACEMENT (2013 FR-S) |             |                         |

REPLACEMENT

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

1. REMOVE FRONT WHEEL

2. SEPARATE FRONT DISC BRAKE CALIPER ASSEMBLY

(a) Remove the 2 bolts and separate the front disc brake caliper assembly from the steering knuckle.

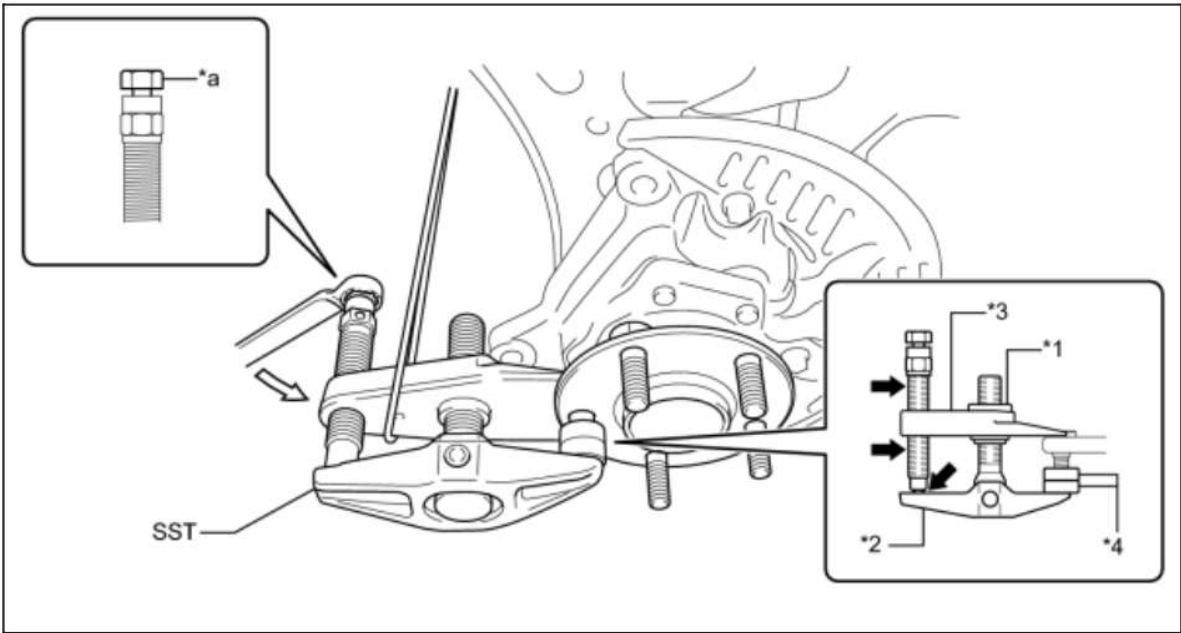
NOTICE:

Hang the caliper using a piece of string or equivalent.

3. REMOVE FRONT DISC INFO

4. REMOVE FRONT AXLE HUB BOLT

(a) Using SST, remove the front axle hub bolt from the front axle hub sub-assembly.



SST: 09960-20010

09961-02010

09961-02060

Text in Illustration

|    |                     |    |                |
|----|---------------------|----|----------------|
| *1 | Nut                 | *2 | Body           |
| *3 | Claw                | *4 | SST (spacer B) |
| *a | Place a wrench here | -  | -              |

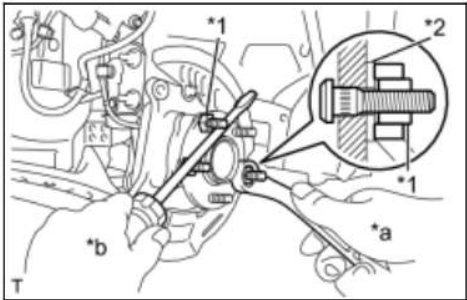
|                                                                                   |                   |                                                                                     |      |
|-----------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|------|
|  | Molybdenum grease |  | Turn |
|-----------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|------|

**CAUTION:**  
Before working, apply molybdenum grease to the bolt threads and bolt tip of SST.

- NOTICE:**
- Install SST so that claw and body are parallel.
  - Make sure to tie the string of SST to the vehicle to prevent SST from dropping.
  - Do not damage the front disc brake dust cover.
  - Do not damage the front axle hub.
  - Do not damage the steering knuckle.

5. INSTALL FRONT AXLE HUB BOLT

(a) Set a new axle hub bolt onto the front axle hub, and tighten the nut (M12 x P1.25mm (0.0492 in.)) through the washer plate to install the axle hub bolt.



Text in Illustration

|    |        |
|----|--------|
| *1 | Nut    |
| *2 | Washer |
| *a | Turn   |
| *b | Hold   |

**NOTICE:**  
Install the nuts to prevent damage to the front axle hub bolts.

6. INSTALL FRONT DISC INFO

7. INSTALL FRONT DISC BRAKE CALIPER ASSEMBLY

(a) Install the front disc brake caliper assembly to the steering knuckle with the 2 new bolts.  
Torque: 80 N·m (816 kgf·cm, 59ft·lbf)

8. INSTALL FRONT WHEEL

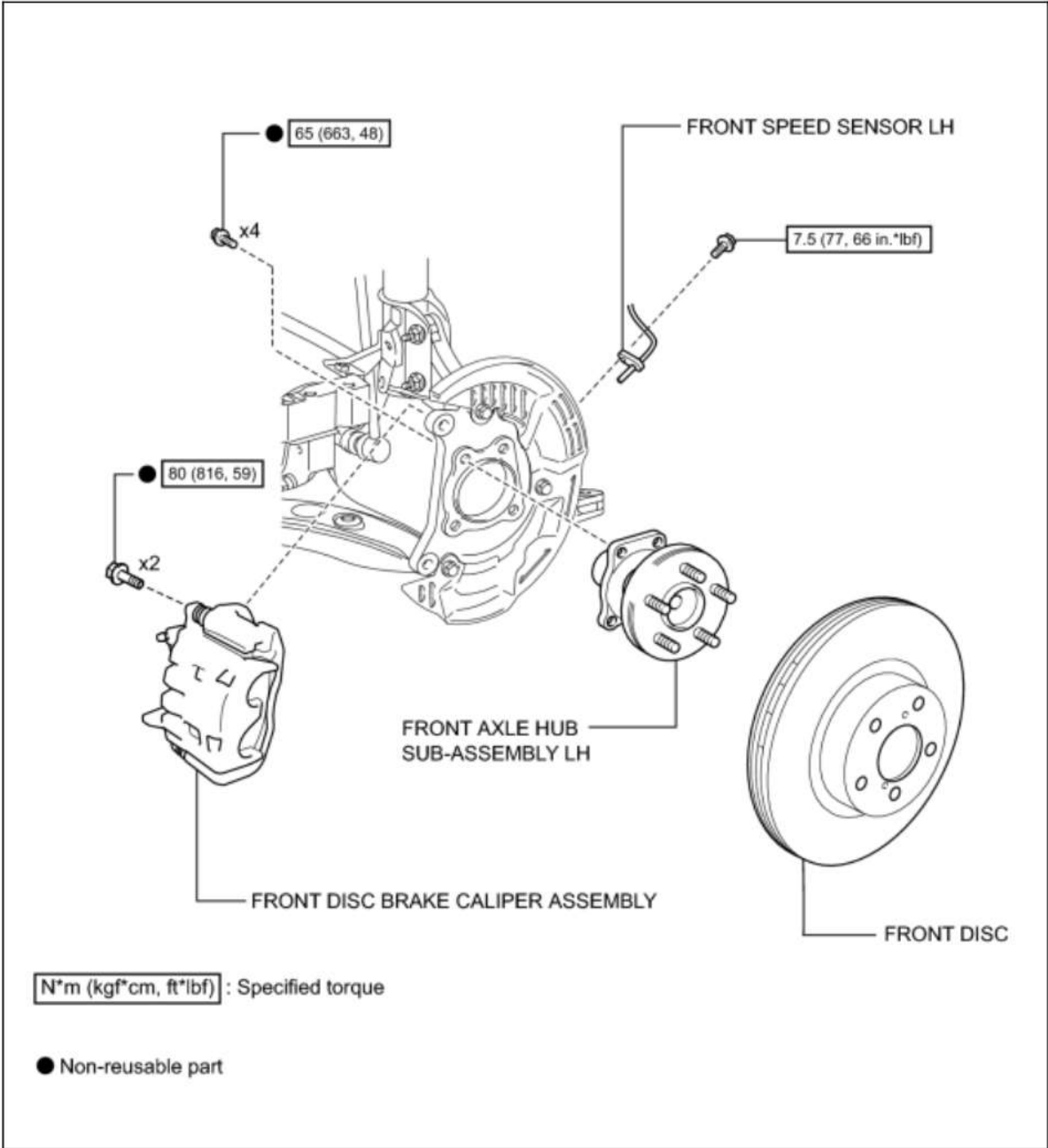
Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)



|                                                                      |             |                         |
|----------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                             | 6.4 K       | From: 201203            |
| Model Year: 2013                                                     | Model: FR-S | Doc ID: RM000000O4D01SX |
| Title: AXLE AND DIFFERENTIAL: FRONT AXLE HUB: COMPONENTS (2013 FR-S) |             |                         |

COMPONENTS

ILLUSTRATION



|                                                                               |                    |                                |
|-------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                               | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                       | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000O4C02GX |
| <b>Title:</b> AXLE AND DIFFERENTIAL: FRONT AXLE HUB: INSTALLATION (2013 FR-S) |                    |                                |

## INSTALLATION

### HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

### 1. INSTALL FRONT AXLE HUB SUB-ASSEMBLY LH

(a) Install the front axle hub sub-assembly to steering knuckle with the 4 new bolts.

**Torque: 65 N·m (663 kgf·cm, 48ft·lbf)**

### NOTICE:

- Do not allow any foreign matter such as dirt or dust to enter between the steering knuckle.
- Do not allow any foreign matter such as dirt or dust to enter between the front axle hub sub-assembly.

### 2. INSPECT FRONT AXLE HUB BEARING LOOSENESS INFO

### 3. INSPECT FRONT AXLE HUB RUNOUT INFO

### 4. INSTALL FRONT SPEED SENSOR LH

(a) Install the bolt and speed sensor front to steering knuckle.

**Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)**

### NOTICE:

Do not allow any foreign matter such as dirt or dust to enter between the steering knuckle and the front disc brake dust cover.

### 5. INSTALL FRONT DISC INFO

### 6. INSTALL FRONT DISC BRAKE CALIPER ASSEMBLY INFO

### 7. INSTALL FRONT WHEEL

**Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)**

### 8. INSPECT SPEED SENSOR SIGNAL

INFO



|                                                                                        |                    |                                |
|----------------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                                        | 6.4 G              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                                | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000X12021X |
| <b>Title:</b> AXLE AND DIFFERENTIAL: FRONT AXLE HUB: ON-VEHICLE INSPECTION (2013 FR-S) |                    |                                |

## ON-VEHICLE INSPECTION

### HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

#### 1. REMOVE FRONT WHEEL

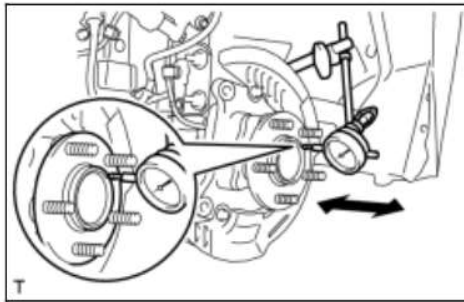
#### 2. SEPARATE FRONT DISC BRAKE CALIPER ASSEMBLY

INFO

#### 3. REMOVE FRONT DISC

INFO

#### 4. INSPECT FRONT AXLE HUB BEARING LOOSENESS



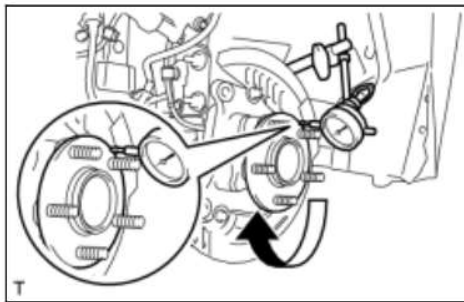
- (a) Using a dial indicator, check for looseness near the center of the front axle hub.

Maximum looseness:  
0.05 mm (0.00196 in.)

### NOTICE:

If the looseness is more than the maximum, replace the front axle hub and bearing assembly.

#### 5. INSPECT FRONT AXLE HUB RUNOUT



- (a) Using a dial indicator, check for runout on the surface of the axle hub outside the hub bolt.

Maximum runout:  
0.05 mm (0.00196 in.)

### NOTICE:

If the looseness is more than the maximum, replace the front axle hub and bearing assembly.

#### 6. INSTALL FRONT DISC

INFO

#### 7. INSTALL FRONT DISC BRAKE CALIPER ASSEMBLY

INFO

#### 8. INSTALL FRONT WHEEL

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)



|                                                                          |                    |                                |
|--------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                          | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                  | <b>Model:</b> FR-S | <b>Doc ID:</b> RM00000004E025X |
| <b>Title:</b> AXLE AND DIFFERENTIAL: FRONT AXLE HUB: REMOVAL (2013 FR-S) |                    |                                |

## REMOVAL

### HINT:

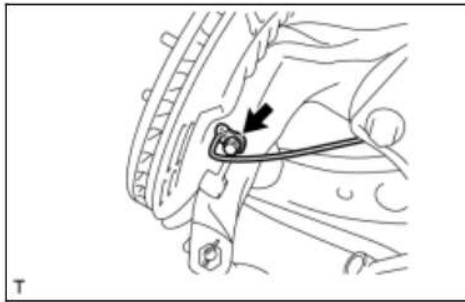
- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

#### 1. REMOVE FRONT WHEEL

#### 2. SEPARATE FRONT DISC BRAKE CALIPER ASSEMBLY INFO

#### 3. REMOVE FRONT DISC INFO

#### 4. DISCONNECT FRONT SPEED SENSOR LH

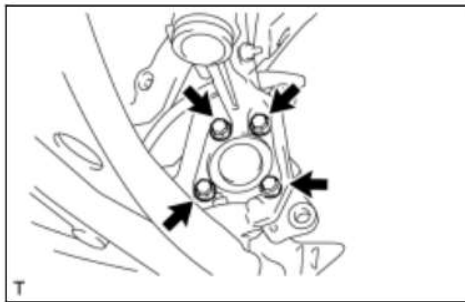


- (a) Remove the bolt, disconnect the front speed sensor LH from the steering knuckle.

### NOTICE:

Clean the speed sensor installation hole and the contact surfaces every time the front speed sensor LH is removed.

#### 5. REMOVE FRONT AXLE HUB SUB-ASSEMBLY LH



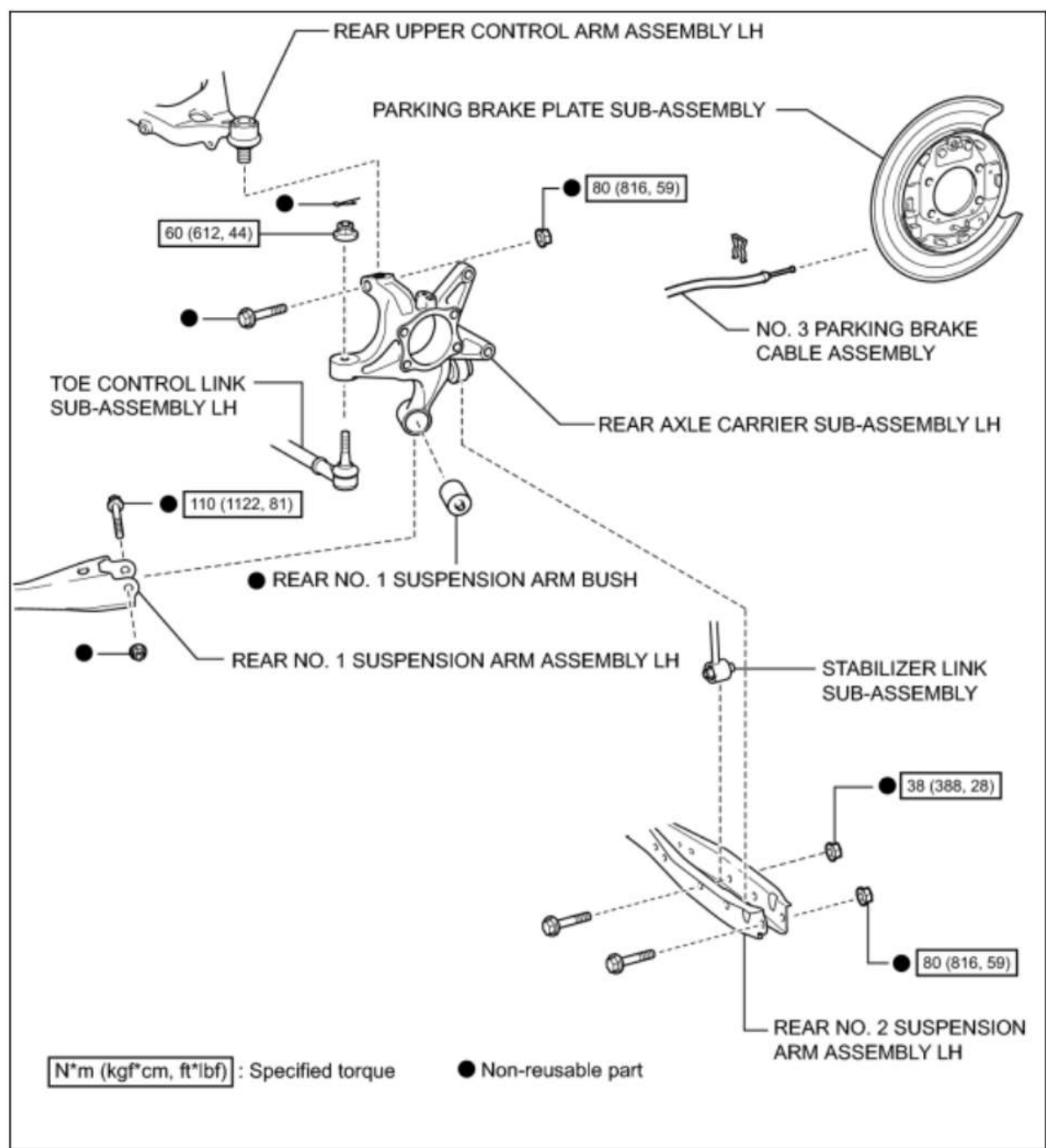
- (a) Remove the 4 bolts, front axle hub sub-assembly LH from the steering knuckle.



|                                                                         |             |                         |
|-------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                | 6.4 K       | From: 201203            |
| Model Year: 2013                                                        | Model: FR-S | Doc ID: RM000000O4L02KX |
| Title: AXLE AND DIFFERENTIAL: REAR AXLE CARRIER: COMPONENTS (2013 FR-S) |             |                         |

COMPONENTS

ILLUSTRATION



|                                                                          |             |                         |
|--------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                 | 6.4 A       | From: 201203            |
| Model Year: 2013                                                         | Model: FR-S | Doc ID: RM000005905000X |
| Title: AXLE AND DIFFERENTIAL: REAR AXLE CARRIER: DISASSEMBLY (2013 FR-S) |             |                         |

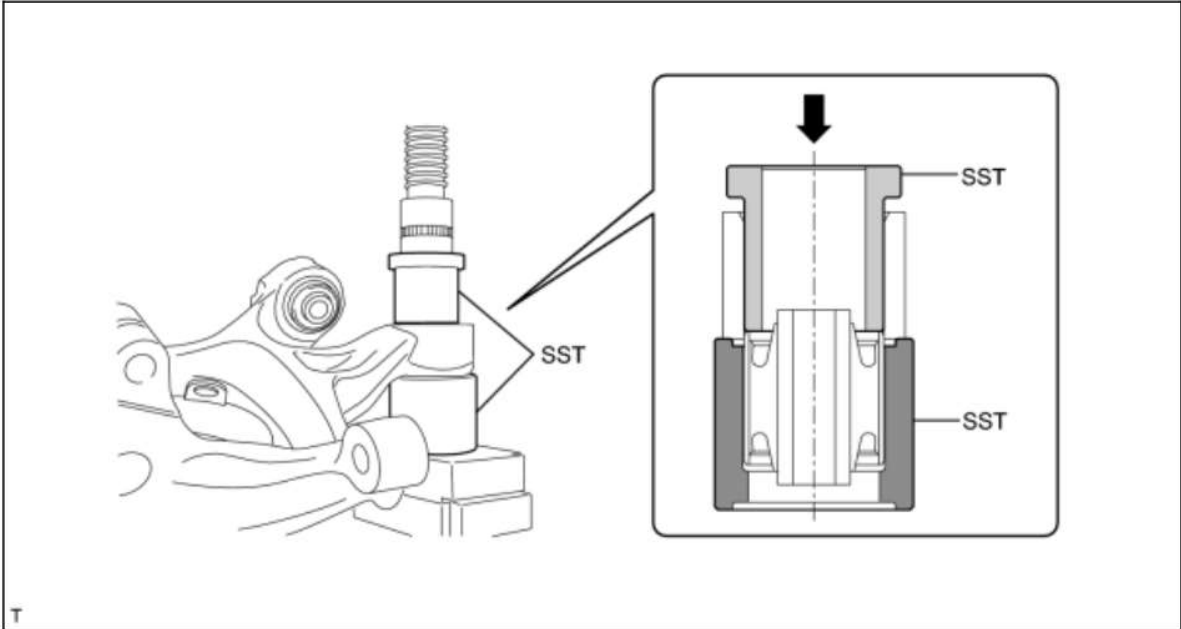
DISASSEMBLY

HINT:

- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. REMOVE REAR NO. 1 SUSPENSION ARM BUSH

(a) Using SST and press, remove the rear No. 1 suspension arm bush.



SST: 09710-18030

SST: 09716-18010

Text in Illustration

|  |               |   |   |
|--|---------------|---|---|
|  | Aspect Weight | - | - |
|--|---------------|---|---|

|                                                                                  |                    |                                |
|----------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                                  | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                          | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000O4K03IX |
| <b>Title:</b> AXLE AND DIFFERENTIAL: REAR AXLE CARRIER: INSTALLATION (2013 FR-S) |                    |                                |

## INSTALLATION

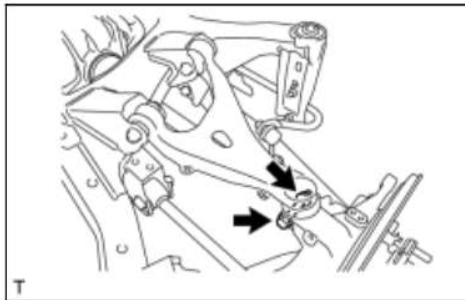
### HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

### 1. INSTALL REAR AXLE CARRIER SUB-ASSEMBLY LH

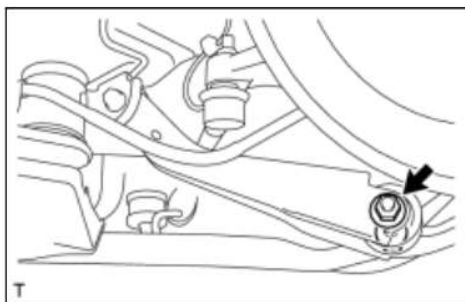
- (a) Using a jack and wooden block, jack up the rear axle carrier sub-assembly LH to replicate standard vehicle height conditions.

### 2. TEMPORARILY TIGHTEN REAR UPPER CONTROL ARM ASSEMBLY LH



- (a) Temporarily tighten the rear upper control arm assembly LH to the rear axle carrier sub-assembly with the new bolt and new nut.

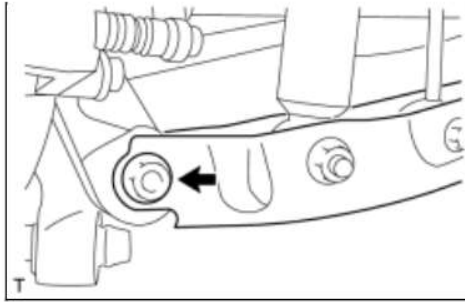
### 3. TEMPORARILY TIGHTEN REAR NO. 1 SUSPENSION ARM ASSEMBLY LH



- (a) Temporarily tighten the rear NO. 1 suspension arm assembly LH to the rear axle carrier sub-assembly with the new bolt and new nut.

### 4. TEMPORARILY TIGHTEN REAR NO. 2 SUSPENSION ARM ASSEMBLY LH

- (a) Temporarily tighten the rear NO. 2 suspension arm assembly LH to the rear axle carrier sub-assembly with



the bolt and new nut.

## 5. INSTALL TOE CONTROL LINK SUB-ASSEMBLY LH

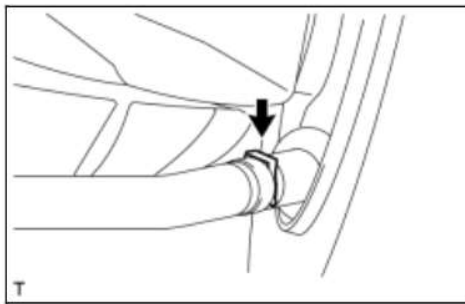
- (a) Install the nut and the toe control link sub-assembly LH to the rear axle carrier sub-assembly.

**Torque: 60 N·m (612 kgf·cm, 44ft·lbf)**

- (b) Install the new cotter pin.

## 6. TEMPORARILY TIGHTEN STABILIZER LINK SUB-ASSEMBLY INFO

## 7. INSTALL NO. 3 PARKING BRAKE CABLE ASSEMBLY



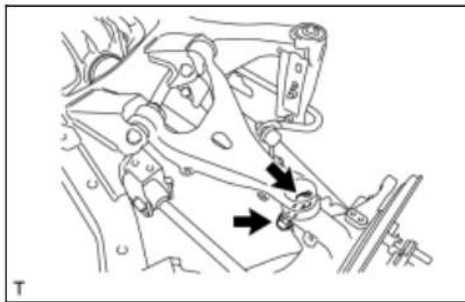
- (a) Install the clip and the NO. 3 parking brake cable assembly to the parking brake plate sub-assembly.

## 8. REASSEMBLY PARKING BRAKE ASSEMBLY

INFO

## 9. STABILIZE SUSPENSION INFO

## 10. FULLY TIGHTEN REAR UPPER CONTROL ARM ASSEMBLY LH



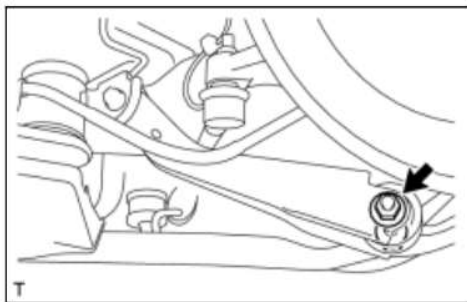
- (a) Fully tighten the bolt.

**Torque: 80 N·m (816 kgf·cm, 59ft·lbf)**

### **HINT:**

**Hold the bolt and tighten the nut.**

## 11. FULLY TIGHTEN REAR NO. 1 SUSPENSION ARM ASSEMBLY LH



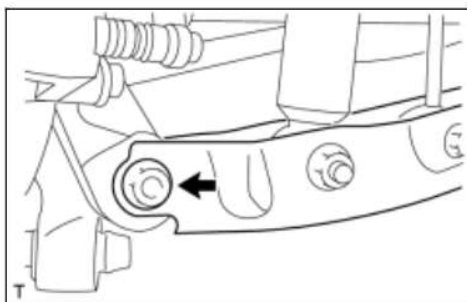
(a) Fully tighten the bolt.

**Torque: 110 N·m (1122 kgf·cm, 81ft·lbf)**

**HINT:**

**Hold the nut and tighten the bolt.**

**12. FULLY TIGHTEN REAR NO. 2 SUSPENSION ARM ASSEMBLY LH**



(a) Fully tighten the bolt.

**Torque: 80 N·m (816 kgf·cm, 59ft·lbf)**

**HINT:**

**Hold the bolt and tighten the nut.**

**13. FULLY TIGHTEN STABILIZER LINK SUB-ASSEMBLY**

INFO

**14. INSTALL REAR AXLE HUB AND BEARING ASSEMBLY LH**

INFO

**15. INSPECT AND ADJUST REAR WHEEL ALIGNMENT**

INFO

**16. VSC SENSOR NEUTRAL MEMORIZATION**

INFO



|                                                                         |             |                         |
|-------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                | 6.4 A       | From: 201203            |
| Model Year: 2013                                                        | Model: FR-S | Doc ID: RM000005906000X |
| Title: AXLE AND DIFFERENTIAL: REAR AXLE CARRIER: REASSEMBLY (2013 FR-S) |             |                         |

REASSEMBLY

HINT:

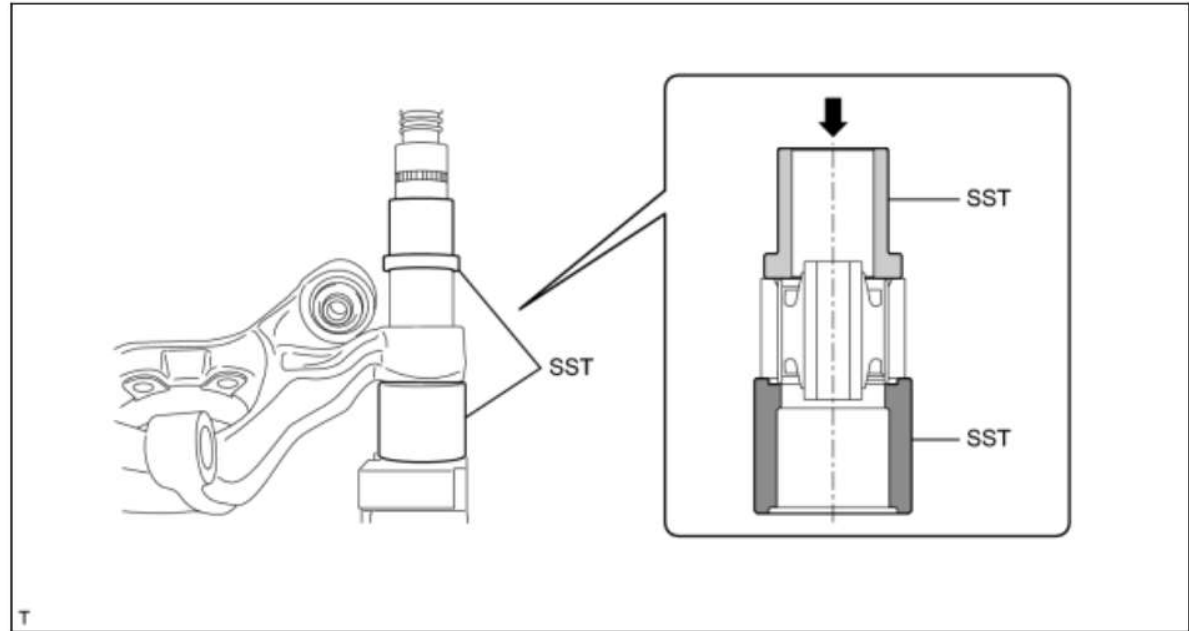
- Use the same procedure for both the RH and LH sides.
- The procedure described below is for the LH side.

1. INSTALL REAR NO. 1 SUSPENSION ARM BUSH

(a) Using SST and a press, install the new rear No. 1 suspension arm bush.

SST: 09710-18030

SST: 09716-18010



Text in Illustration

|  |               |   |   |
|--|---------------|---|---|
|  | Aspect Weight | - | - |
|--|---------------|---|---|

|                                                                             |                    |                                |
|-----------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                             | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                     | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000O4M033X |
| <b>Title:</b> AXLE AND DIFFERENTIAL: REAR AXLE CARRIER: REMOVAL (2013 FR-S) |                    |                                |

## REMOVAL

### HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

#### 1. REMOVE REAR AXLE HUB AND BEARING ASSEMBLY LH

INFO

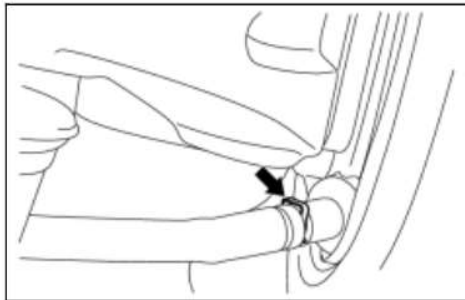
#### 2. DISASSEMBLY PARKING BRAKE ASSEMBLY

INFO

#### 3. SEPARATE STABILIZER LINK SUB-ASSEMBLY

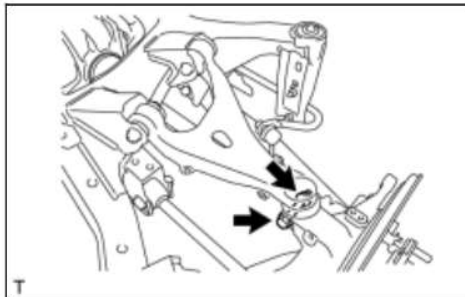
INFO

#### 4. SEPARATE NO. 3 PARKING BRAKE CABLE ASSEMBLY



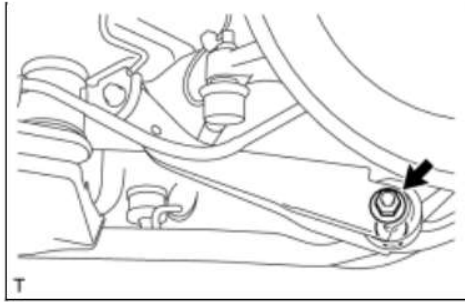
- (a) Remove the clip and separate the No. 3 parking brake cable assembly from parking brake plate sub-assembly.

#### 5. SEPARATE REAR UPPER CONTROL ARM ASSEMBLY LH



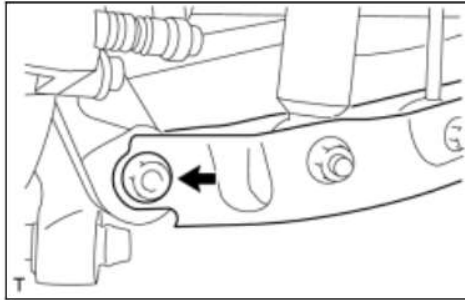
- (a) Remove the bolt, nut and separate the rear upper control arm assembly LH from rear axle carrier.

#### 6. SEPARATE REAR NO. 1 SUSPENSION ARM ASSEMBLY LH



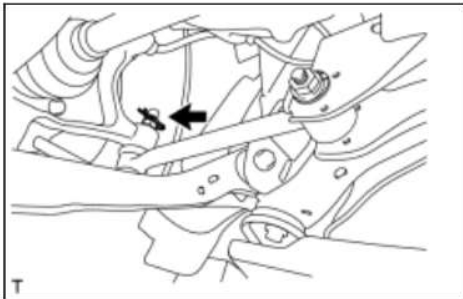
- (a) Remove the bolt, nut and separate the rear No. 1 suspension arm assembly LH from rear axle carrier.

## 7. SEPARATE REAR NO. 2 SUSPENSION ARM ASSEMBLY LH



- (a) Remove the bolt, nut and separate the rear No. 2 suspension arm assembly LH from rear axle carrier.

## 8. DISCONNECT TOE CONTROL LINK SUB-ASSEMBLY LH

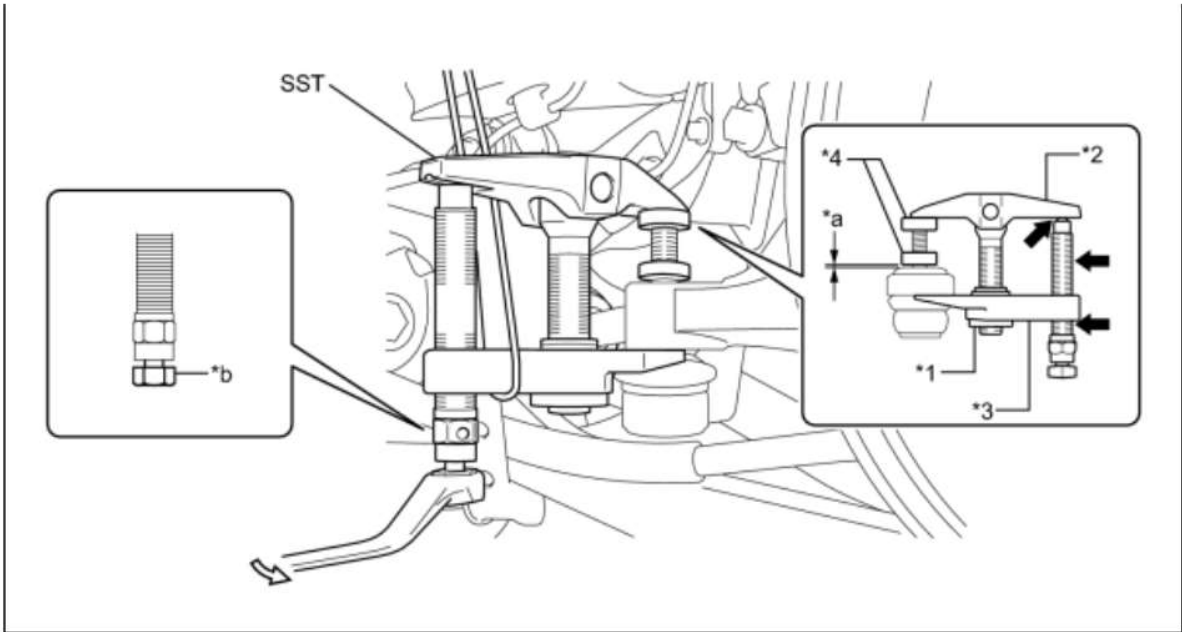


- (a) Remove the cotter pin.
- (b) Remove the nut.
- (c) Install the SST (spacer B) as shown in the illustration.

### **NOTICE:**

**As SST may become damaged, make sure the space between the toe control link sub-assembly LH and spacers is not less than 1 mm (0.0394 in.).**

- (d) Using SST, disconnect the toe control link sub-assembly LH from the rear axle carrier as shown in the illustration.



**SST: 09960-20010**

09961-02010

09961-02060

**Text in Illustration**

|                                                                                     |                   |                                                                                      |                     |
|-------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------|---------------------|
| *1                                                                                  | Nut               | *2                                                                                   | Body                |
| *3                                                                                  | Claw              | *4                                                                                   | SST (spacer B)      |
| *a                                                                                  | 1 mm (0.0394 in.) | *b                                                                                   | Place a wrench here |
|  | Molybdenum grease |  | Turn                |

**CAUTION:**  
Before working, apply molybdenum grease to the bolt threads and bolt tip of SST.

- NOTICE:**
- Install SST so that claw and body are parallel.
  - Make sure to tie the string of SST to the vehicle to prevent SST from dropping.
  - Do not damage the toe-control link ball joint dust cover.
  - Do not damage the toe-control link sub-assembly.
  - Do not damage the parking brake plate sub-assembly.
  - Do not damage the rear axle carrier.

**9. REMOVE PARKING BRAKE PLATE SUB-ASSEMBLY**

**10. REMOVE REAR AXLE CARRIER SUB-ASSEMBLY LH**

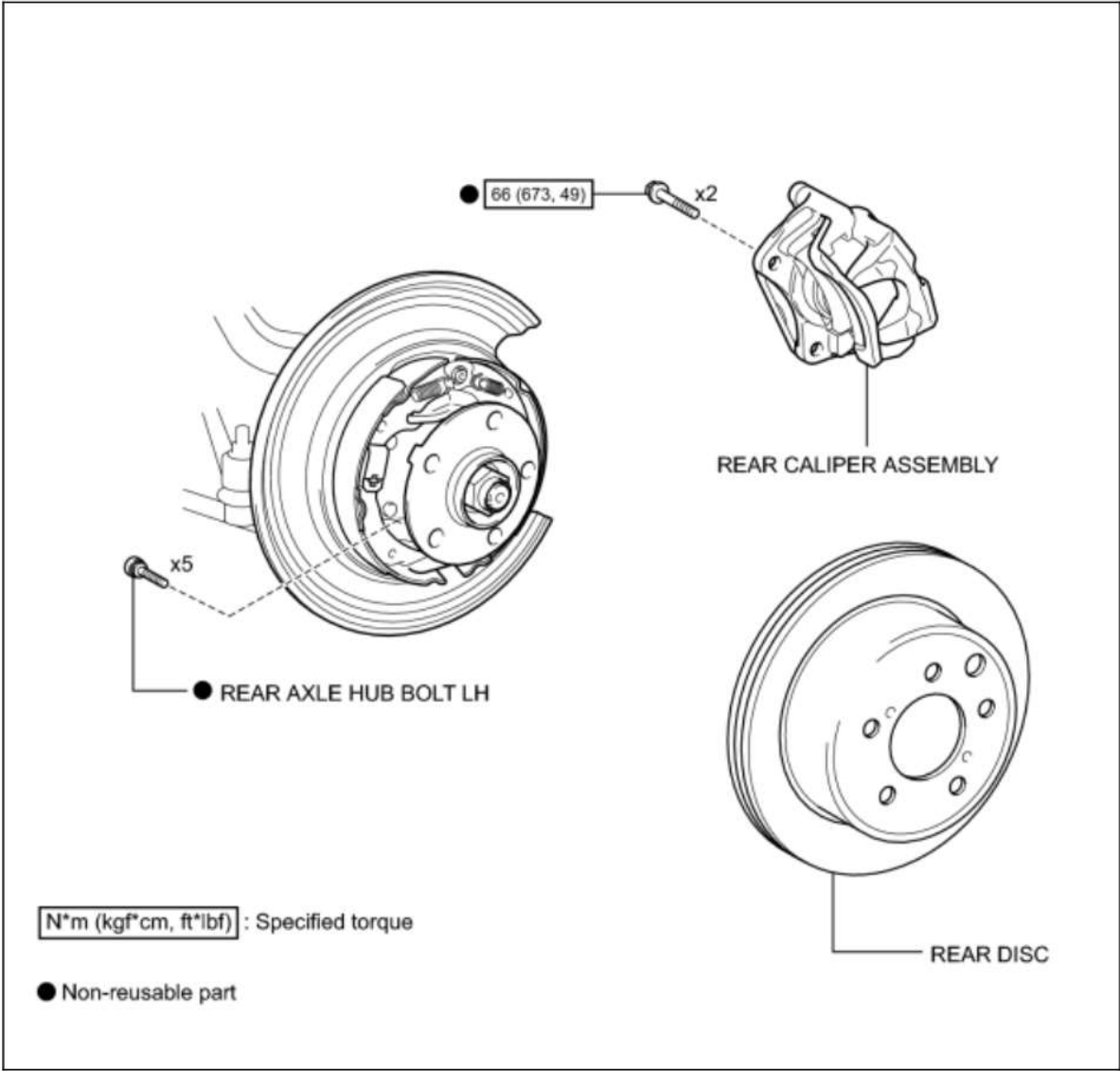
(a) Hold the drive shaft and remove the rear axle carrier sub-assembly LH.



|                                                                          |             |                         |
|--------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                 | 6.4 K       | From: 201203            |
| Model Year: 2013                                                         | Model: FR-S | Doc ID: RM000000V7I01TX |
| Title: AXLE AND DIFFERENTIAL: REAR AXLE HUB BOLT: COMPONENTS (2013 FR-S) |             |                         |

COMPONENTS

ILLUSTRATION



cardiagn.com

|                                                                           |             |                         |
|---------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                  | 6.4 A       | From: 201203            |
| Model Year: 2013                                                          | Model: FR-S | Doc ID: RM000000V7H02FX |
| Title: AXLE AND DIFFERENTIAL: REAR AXLE HUB BOLT: REPLACEMENT (2013 FR-S) |             |                         |

REPLACEMENT

HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

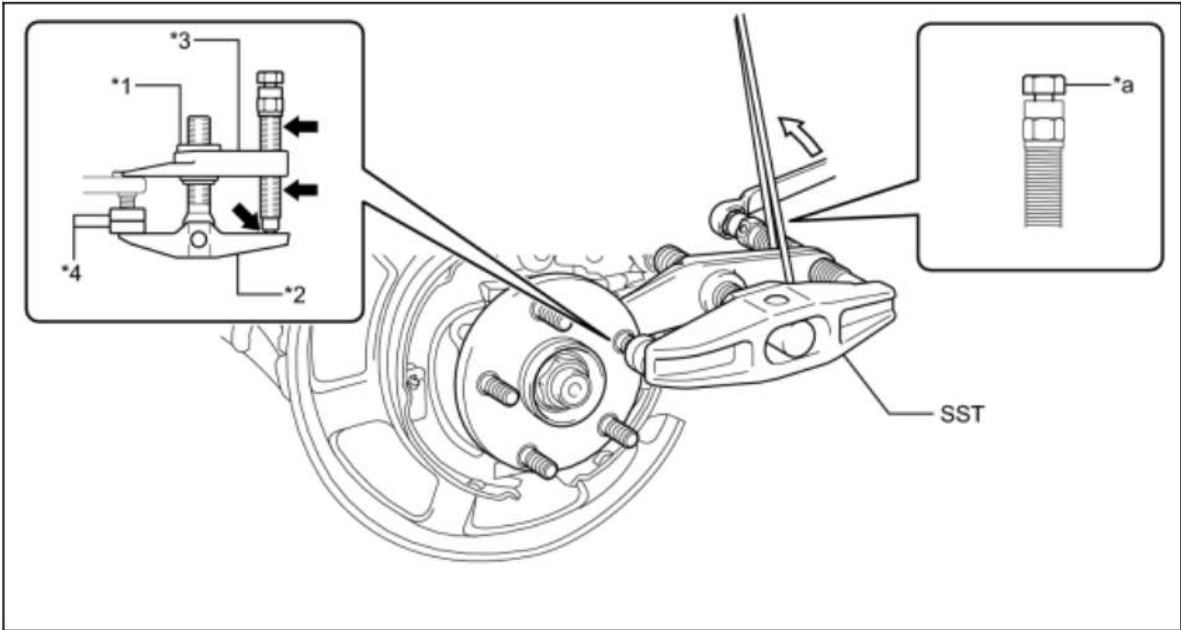
1. REMOVE REAR WHEEL

2. SEPARATE REAR CALIPER ASSEMBLY INFO

3. REMOVE REAR DISC INFO

4. REMOVE REAR AXLE HUB BOLT LH

(a) Using SST, remove the rear axle hub bolt LH from rear axle hub and bearing assembly LH.



SST: 09960-20010

09961-02010

09961-02060

Text in illustration

|    |                     |    |                |
|----|---------------------|----|----------------|
| *1 | Nut                 | *2 | Body           |
| *3 | Claw                | *4 | SST (spacer B) |
| *a | Place a wrench here | -  | -              |
|    | Molybdenum grease   |    | Turn           |

**CAUTION:**

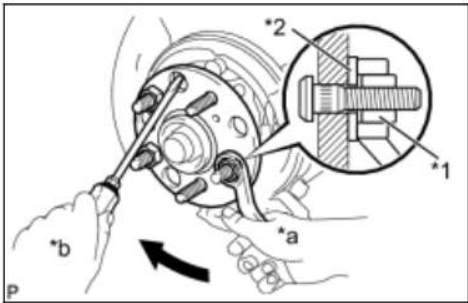
Before working, apply molybdenum grease to the bolt threads and bolt tip of SST.

**NOTICE:**

- Install SST so that claw and body are parallel
- Make sure to tie the string of SST to the vehicle to prevent SST from dropping.
- Do not damage the parking brake plate sub-assembly.
- Do not damage the rear axle carrier.
- Do not damage the rear axle hub and bearing.

**5. INSTALL REAR AXLE HUB BOLT LH**

(a) Set a new axle hub bolt onto the rear axle hub and bearing, and tighten the nut (M12 x P1.25mm (0.0492 in.)) through the washer plate to install the axle hub bolt.



Text in Illustration

|    |        |
|----|--------|
| *1 | Nut    |
| *2 | Washer |
| *a | Turn   |
| *b | Hold   |

**NOTICE:**

Install the nuts to prevent damage to the rear axle hub bolt LHs LH.

**6. INSTALL REAR DISC** INFO

**7. INSTALL REAR CALIPER ASSEMBLY** INFO

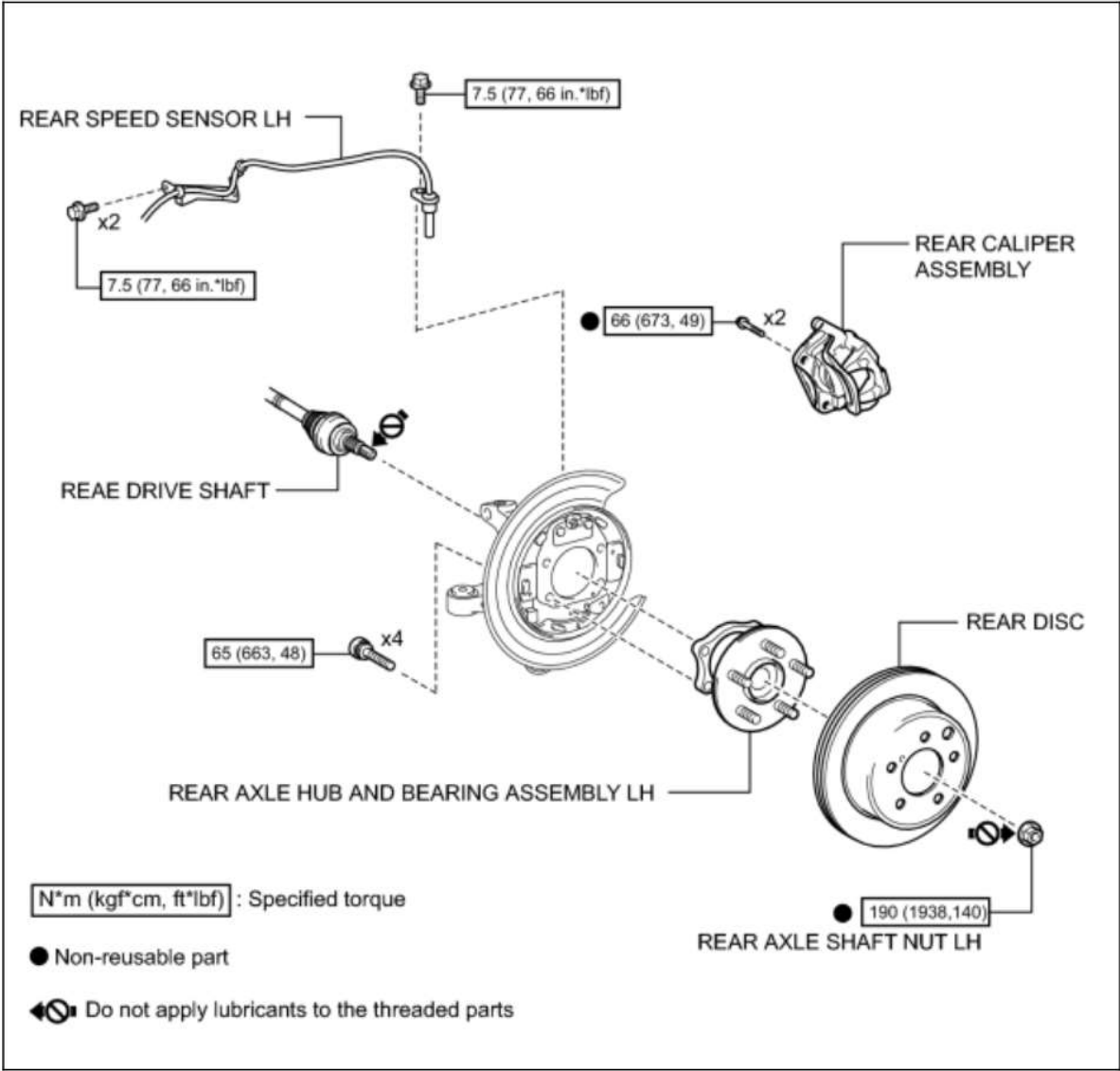
**8. INSTALL REAR WHEEL**

Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)

|                                                                     |             |                         |
|---------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                            | 6.4 K       | From: 201203            |
| Model Year: 2013                                                    | Model: FR-S | Doc ID: RM000000O4L02IX |
| Title: AXLE AND DIFFERENTIAL: REAR AXLE HUB: COMPONENTS (2013 FR-S) |             |                         |

COMPONENTS

ILLUSTRATION



|                                                                              |                    |                                |
|------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                              | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                      | <b>Model:</b> FR-S | <b>Doc ID:</b> RM00000004K03FX |
| <b>Title:</b> AXLE AND DIFFERENTIAL: REAR AXLE HUB: INSTALLATION (2013 FR-S) |                    |                                |

## INSTALLATION

### HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

### 1. INSTALL REAR AXLE HUB AND BEARING ASSEMBLY LH

- (a) Install the rear axle hub and bearing assembly to the rear axle assembly with the 4 bolts.

**Torque: 65 N·m (663 kgf·cm, 48ft·lbf)**

### 2. INSTALL REAR DISC

INFO

### 3. INSTALL REAR CALIPER ASSEMBLY

INFO

### 4. STAKE REAR AXLE SHAFT NUT LH

- (a) Clean the threaded parts on the rear drive shaft assembly and a new rear axle shaft nut using a non-residue solvent.

### NOTICE:

- Be sure to perform this step even when using a new rear drive shaft assembly.
- Keep the threaded parts free of oil and foreign matter.

- (b) Install the new rear axle shaft nut.

**Torque: 190 N·m (1938 kgf·cm, 140ft·lbf)**

### HINT:

Stake the rear axle shaft nut LH after inspecting for looseness and runout in the following steps.

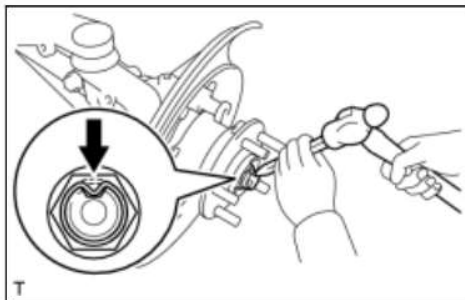
### 5. INSPECT REAR AXLE HUB BEARING LOOSENESS

INFO

### 6. INSPECT REAR AXLE HUB RUNOUT

INFO

### 7. STAKE REAR AXLE SHAFT NUT LH



- (a) Using a chisel and hammer, stake the rear axle shaft nut LH.

### 8. INSTALL REAR SPEED SENSOR LH

- (a) Install the bolt and the rear speed sensor LH.

**Torque: 7.5 N·m (77 kgf·cm, 66in·lbf)**

#### **9. INSTALL REAR WHEEL**

**Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)**

#### **10. ADJUST PARKING BRAKE LEVER TRAVEL**

INFO

#### **11. INSPECT SPEED SENSOR SIGNAL**

INFO



|                                                                                       |                    |                                |
|---------------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                                       | 6.4 G              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                               | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000X1301ZX |
| <b>Title:</b> AXLE AND DIFFERENTIAL: REAR AXLE HUB: ON-VEHICLE INSPECTION (2013 FR-S) |                    |                                |

## ON-VEHICLE INSPECTION

### HINT:

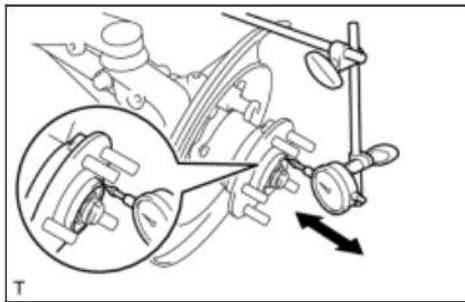
- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

#### 1. REMOVE REAR WHEEL

#### 2. SEPARATE REAR CALIPER ASSEMBLY INFO

#### 3. REMOVE REAR DISC INFO

#### 4. INSPECT REAR AXLE HUB BEARING LOOSENESS



- (a) Using a dial indicator, check for looseness near the center of the rear axle hub.

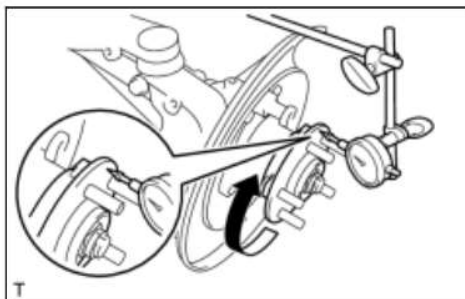
Maximum looseness:  
0.05 mm (0.00196 in.)

#### NOTICE:

- Make sure that the dial indicator is set perpendicular to the measurement surface.
- Keep the magnet of the dial indicator away from the rear axle hub and bearing assembly.

If the looseness is more than the maximum, replace the rear axle hub and bearing assembly.

#### 5. INSPECT REAR AXLE HUB RUNOUT



- (a) Using a dial indicator, check for runout on the surface of the rear axle hub and bearing assembly outside the rear axle hub bolt.

Maximum runout:  
0.05 mm (0.00196 in.)

#### NOTICE:

- Make sure that the dial indicator is set perpendicular to the measurement surface.
- Keep the magnet of the dial indicator away from the rear axle hub and bearing assembly.

If the runout is more than the maximum, replace the rear axle hub and bearing assembly.

#### 6. INSTALL REAR DISC INFO

**7. INSTALL REAR CALIPER ASSEMBLY**

INFO

**8. INSTALL REAR WHEEL****Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)**

|                                                                         |                    |                                |
|-------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                         | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                 | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000O4M031X |
| <b>Title:</b> AXLE AND DIFFERENTIAL: REAR AXLE HUB: REMOVAL (2013 FR-S) |                    |                                |

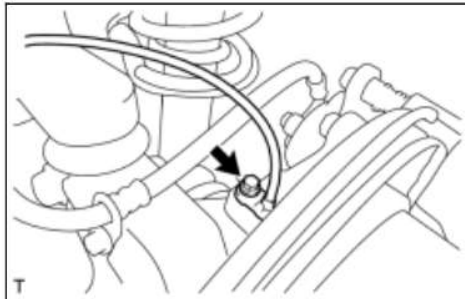
## REMOVAL

### HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

#### 1. REMOVE REAR WHEEL

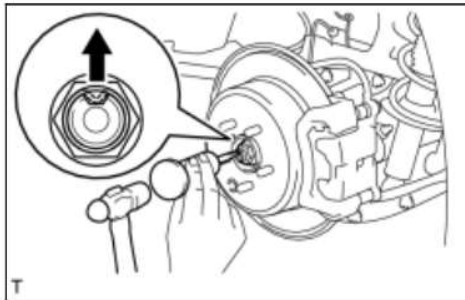
#### 2. SEPARATE REAR SPEED SENSOR LH



- (a) Remove the bolt and separate rear speed sensor LH.

### NOTICE:

Prevent foreign matter from attaching to the sensor tip.



#### 3. REMOVE REAR AXLE SHAFT NUT LH

- (a) Using SST and a hammer, release the staked part of the rear axle shaft nut.

**SST: 09930-00010**

### NOTICE:

- Do not grind the SST.
- Release the staked part of the nut completely, otherwise the threads of the drive shaft may be damaged.

- (b) Remove the rear axle shaft nut.

#### 4. SEPARATE REAR CALIPER ASSEMBLY INFO

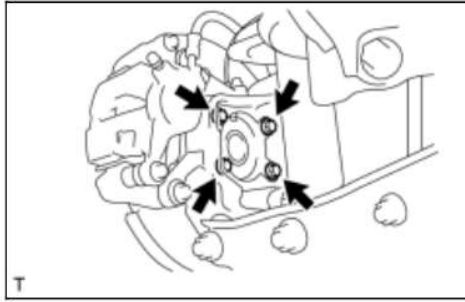
#### 5. REMOVE REAR DISC INFO

#### 6. REMOVE REAR AXLE HUB AND BEARING ASSEMBLY LH

- (a) Using a plastic-faced hammer, disconnect the rear drive shaft assembly from the rear axle hub and bearing assembly LH.

### NOTICE:

- Be careful not to damage the boot.
- Use wire or equivalent to prevent the rear drive shaft assembly from hanging down.



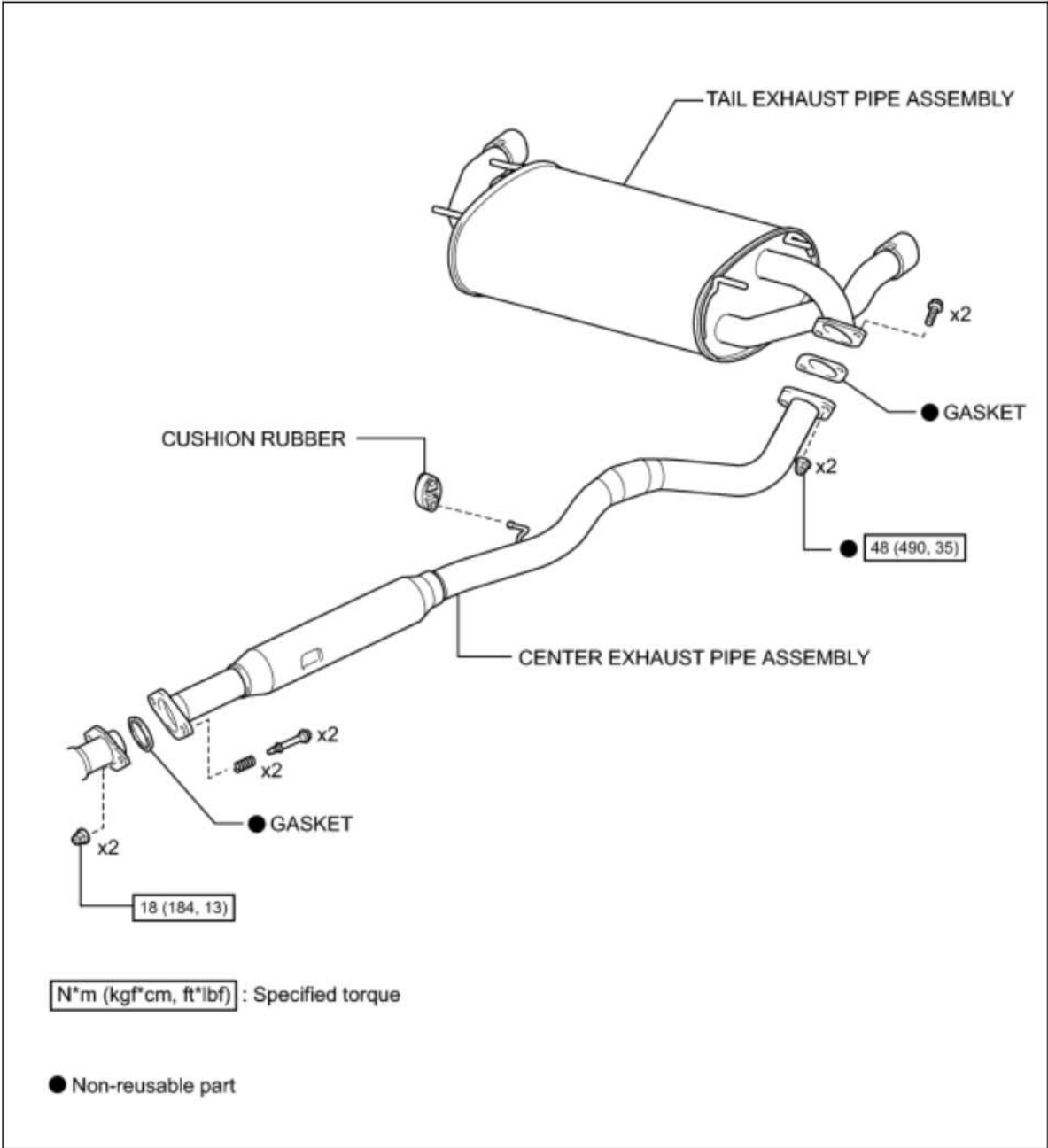
- (b) Remove the 4 bolts and the rear axle hub and bearing assembly LH from the rear axle assembly.



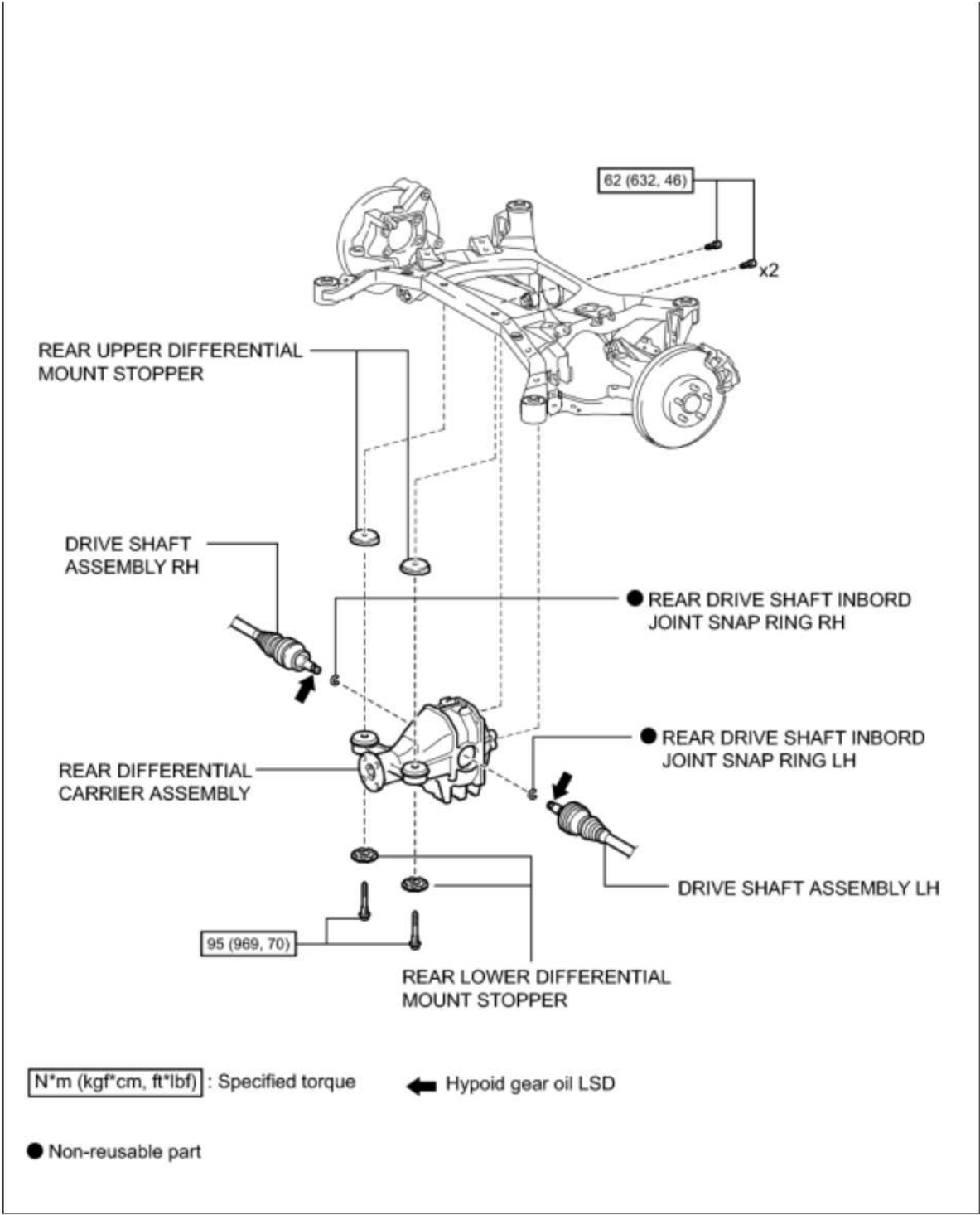
|                                                                                          |             |                         |
|------------------------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                                 | 6.4 K       | From: 201203            |
| Model Year: 2013                                                                         | Model: FR-S | Doc ID: RM000001V2P01DX |
| Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER ASSEMBLY: COMPONENTS (2013 FR-S) |             |                         |

COMPONENTS

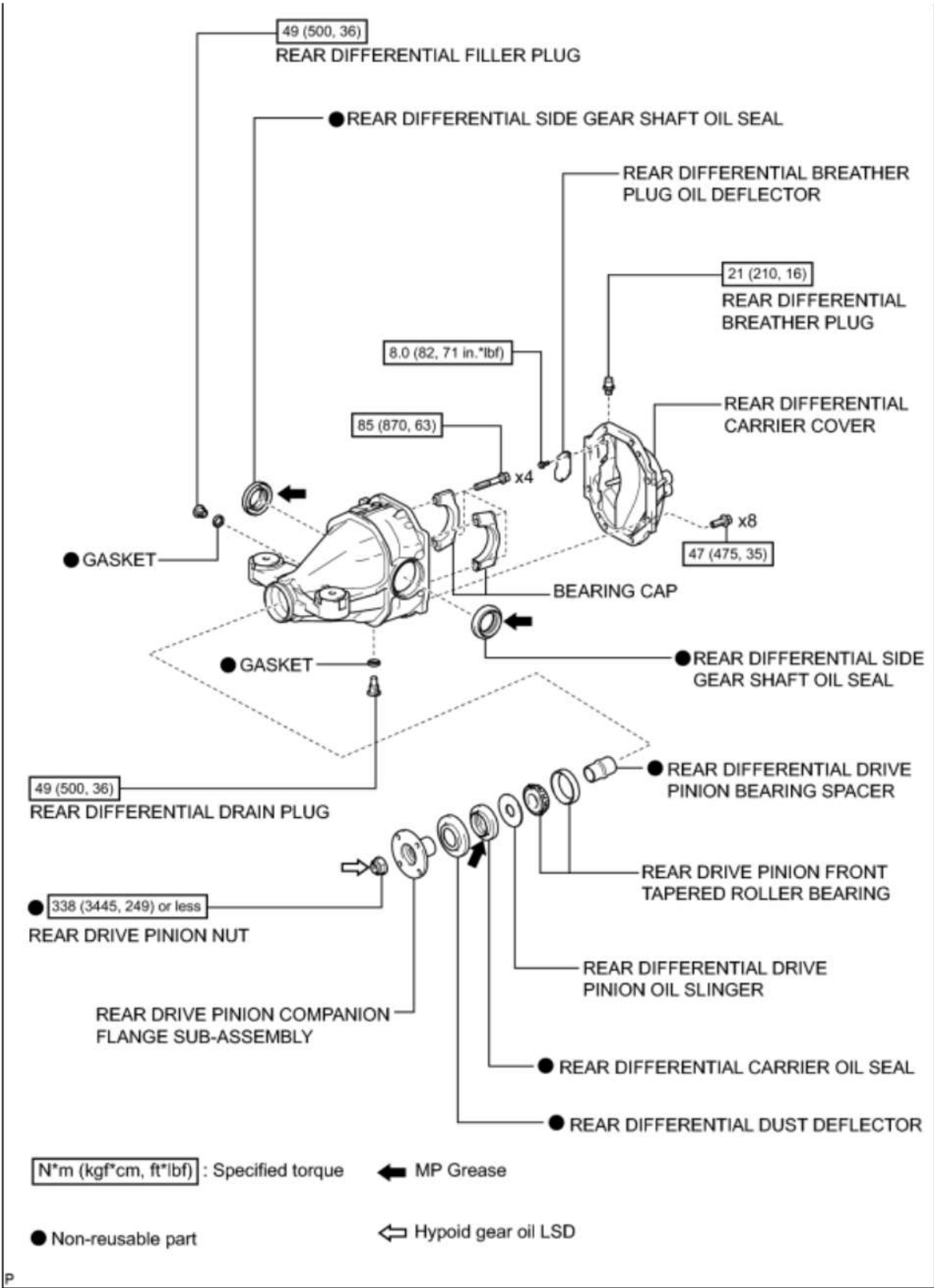
ILLUSTRATION



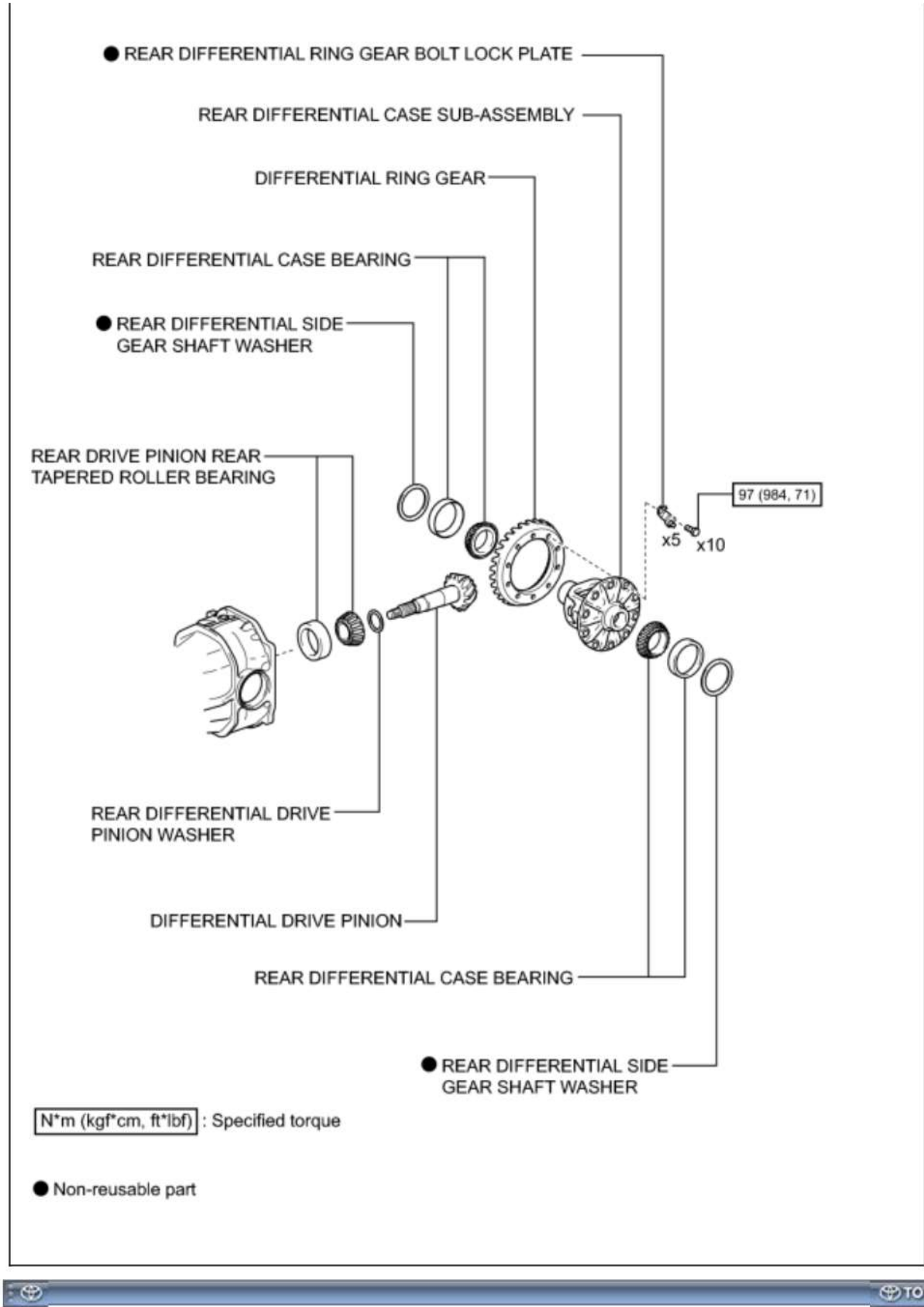
ILLUSTRATION



**ILLUSTRATION**



**ILLUSTRATION**

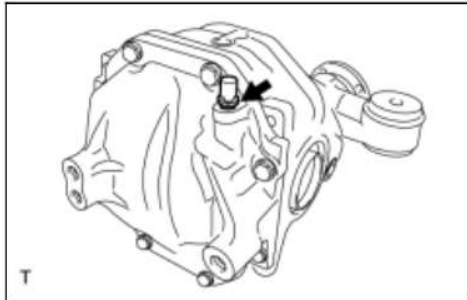


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|                                                                                                  |                    |                                |
|--------------------------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                                                  | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                                          | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000O5901CX |
| <b>Title:</b> AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER ASSEMBLY: DISASSEMBLY (2013 FR-S) |                    |                                |

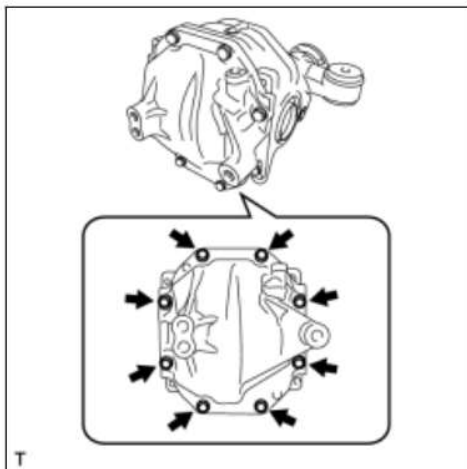
## **DISASSEMBLY**

### **1. REMOVE REAR DIFFERENTIAL BREATHER PLUG**



- (a) Remove the rear differential breather plug from the rear differential carrier cover.

### **2. REMOVE REAR DIFFERENTIAL CARRIER COVER**

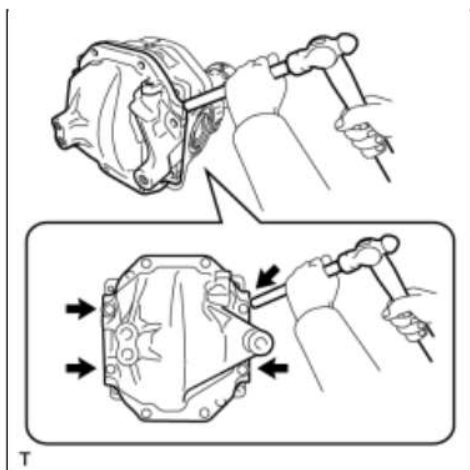


- (a) Remove the 8 bolts.

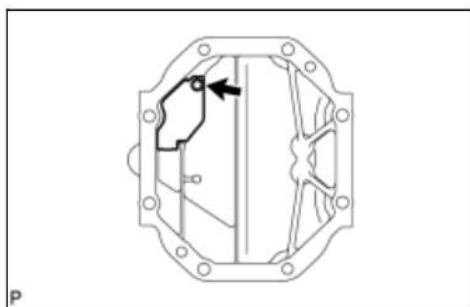
- (b) Using a brass bar and a hammer, remove the rear differential carrier cover from the rear differential carrier assembly.

#### **NOTICE:**

- Place the brass bar onto the corners of the rear differential carrier cover.
- Do not damage the sealing surface of the rear differential carrier.

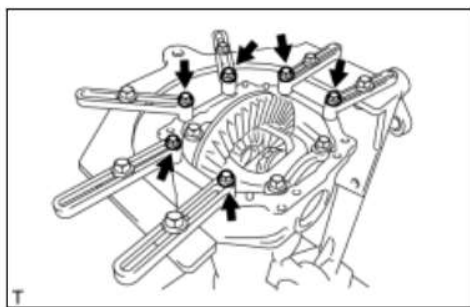


### 3. REMOVE REAR DIFFERENTIAL BREATHER PLUG OIL DEFLECTOR



- (a) Remove the bolt and the rear differential breather plug oil deflector from the rear differential carrier cover.

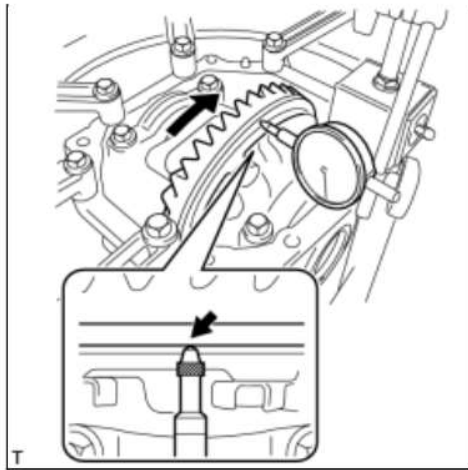
### 4. SECURE REAR DIFFERENTIAL CARRIER SUB-ASSEMBLY



- (a) Secure the rear differential carrier sub-assembly to the overhaul stand with the 6 bolts.

### 5. INSPECT RUNOUT OF DIFFERENTIAL RING GEAR

- (a) Set a dial indicator perpendicular to the end of the



differential ring gear face.

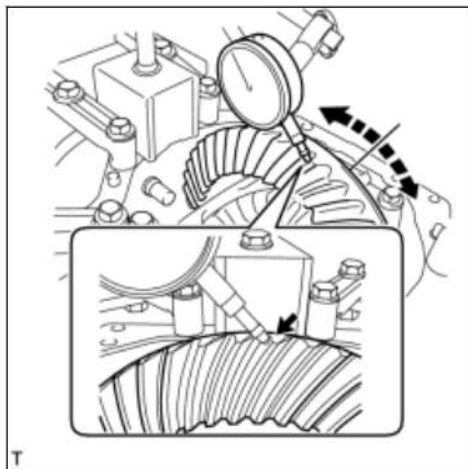
(b) Rotate the differential ring gear and measure the runout.

Maximum runout:

0.07 mm (0.00275 in.)

If the runout is more than the specified maximum value, remove the differential ring gear and check the runout of the rear differential case sub-assembly.

## 6. INSPECT DIFFERENTIAL RING GEAR BACKLASH



(a) While holding the rear drive pinion companion flange sub-assembly, rotate the differential ring gear and measure the backlash.

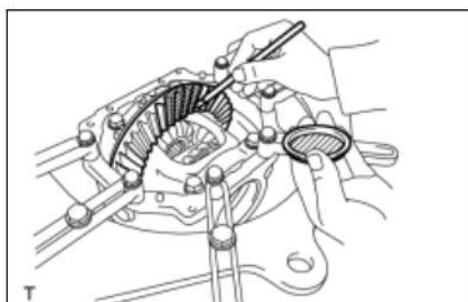
Standard Backlash:

0.13 to 0.18 mm (0.00512 to 0.00708 in.)

### HINT:

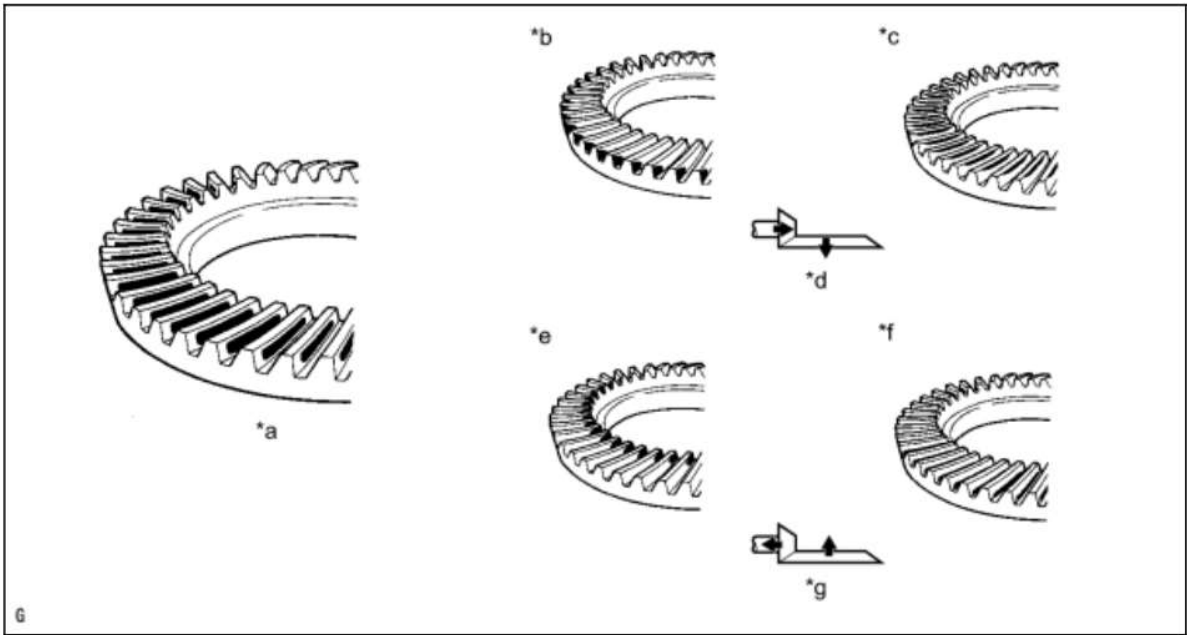
- Record the measured backlash to use as a reference for selecting a rear differential side gear shaft plate washer.
- Inspect the tooth contact and use the result as a reference for selecting a rear differential side gear shaft plate washer.

## 7. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION



(a) Coat 3 or 4 teeth at 3 different positions on the differential ring gear with Prussian blue.

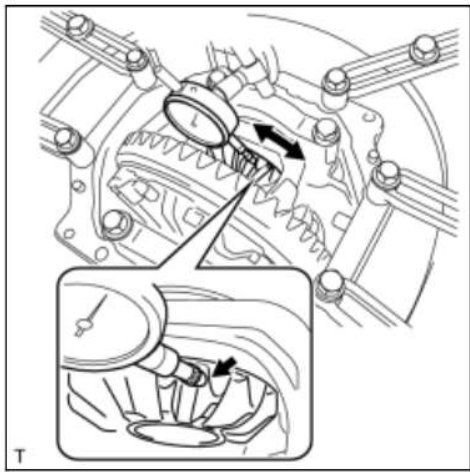
- (b) Rotate the differential ring gear in both directions.
- (c) Inspect the tooth contact pattern.



Text in Illustration

|    |                                                                                 |    |                                                                                 |
|----|---------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------|
| *a | Proper Contact                                                                  | *b | Heel Contact                                                                    |
| *c | Face Contact                                                                    | *d | Select an adjusting washer that brings the drive pinion closer to the ring gear |
| *e | Toe Contact                                                                     | *f | Flank Contact                                                                   |
| *g | Select an adjusting washer that shifts the drive pinion away from the ring gear | -  | -                                                                               |

8. INSPECT DIFFERENTIAL SIDE GEAR BACKLASH

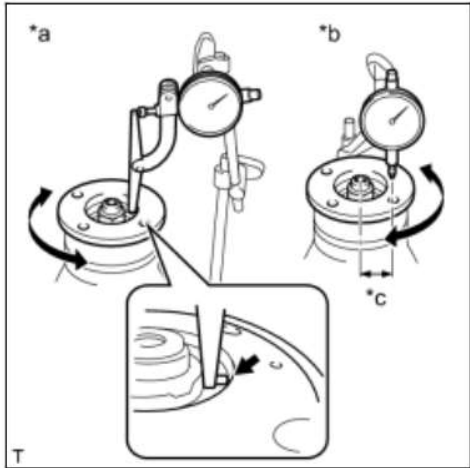


- (a) Place a dial indicator on the tip of a side gear tooth at a right angle. Hold the pinion gear in the rear differential case sub-assembly and check that the backlash.
- Standard Backlash:  
0 mm (0 in.)
- If the result is not as specified, replace the rear differential case sub-assembly with a new one.

9. INSPECT RUNOUT OF REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY

- (a) Using a dial indicator, measure the vertical and lateral runout of the rear drive pinion companion flange sub-assembly.

Text in Illustration



|    |                   |
|----|-------------------|
| *a | Vertical Runout   |
| *b | Lateral Runout    |
| *c | 30 mm (1.181 in.) |

Maximum Runout:

| ITEM            | SPECIFIED CONDITION   |
|-----------------|-----------------------|
| Vertical runout | 0.09 mm (0.00354 in.) |
| Lateral runout  | 0.09 mm (0.00354 in.) |

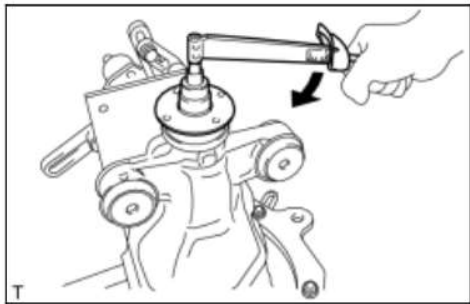
**NOTICE:**  
Measure the runout of the rear drive pinion companion flange horizontally at a position 30 mm (1.18 in.) away from the center of the differential drive pinion shaft.

If the runout is more than the maximum value, replace the rear drive pinion companion flange.

10. INSPECT DIFFERENTIAL DRIVE PINION PRELOAD

- (a) Using a torque wrench, measure the starting torque of the differential drive pinion.

Differential drive pinion preload (at starting):  
1.11 to 1.91 N\*m (11.3 to 19.5 kgf\*cm, 9.8 to 16.9 in.\*lbf)



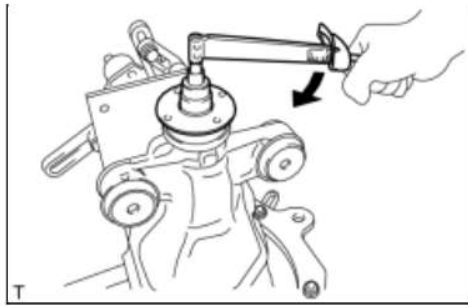
**HINT:**

- The backlash between the differential drive pinion and differential ring gear should allow enough movement of the differential drive pinion to allow this measurement to be performed.
- Make sure not to include the preload of the differential ring gear (rear differential case sub-assembly) in the measurement of the differential drive pinion preload.

11. INSPECT TOTAL PRELOAD

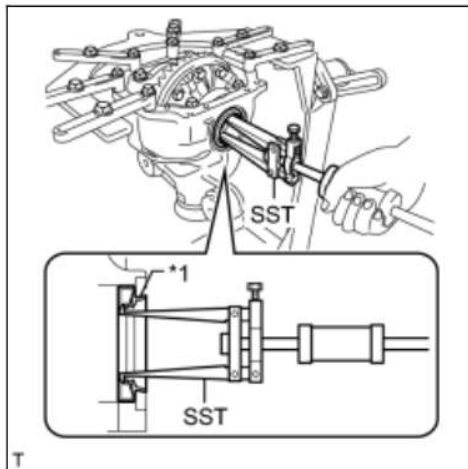
- (a) Using a torque wrench, measure the preload with the teeth of the differential drive pinion and differential ring gear in contact.

Total preload (at starting):



1.60 to 2.69 N\*m (16.3 to 27.4 kgf\*cm, 14.2 to 23.8 in.\*lbf)

## 12. REMOVE REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL



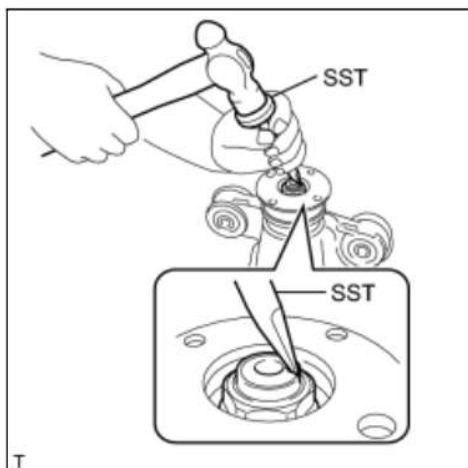
(a) Using SST, remove the 2 rear differential side gear shaft oil seals.

**SST: 09308-00010**

**Text in Illustration**

|    |                                            |
|----|--------------------------------------------|
| *1 | Rear Differential Side Gear Shaft Oil Seal |
|----|--------------------------------------------|

## 13. REMOVE REAR DRIVE PINION NUT



(a) Using SST and a hammer, unstack the staked part of the rear drive pinion nut.

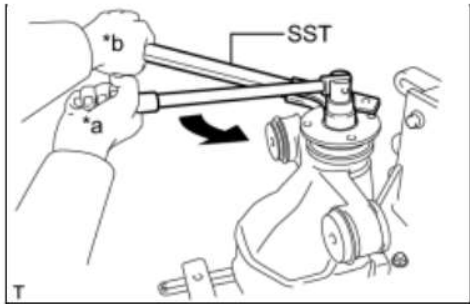
**SST: 09930-00010**

### **NOTICE:**

- Be sure to use SST with the tapered surface facing the differential drive pinion.
- Do not grind the tip of SST with a grinder, etc.
- Completely loosen the staked part of the rear drive pinion nut when removing it.
- Do not damage the threads of the differential drive pinion.

(b) Using SST to hold the rear drive pinion companion flange, remove the rear drive pinion nut.

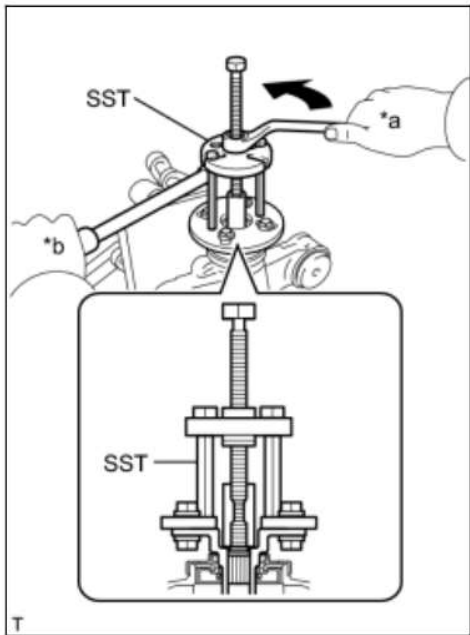
**SST: 09330-00021**



Text in Illustration

|    |      |
|----|------|
| *a | Turn |
| *b | Hold |

14. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY



(a) Using SST, remove the rear drive pinion companion flange sub-assembly.

Text in Illustration

|    |      |
|----|------|
| *a | Turn |
| *b | Hold |

SST: 09950-30012

09951-03010

09953-03010

09954-03010

09955-03030

09956-03030

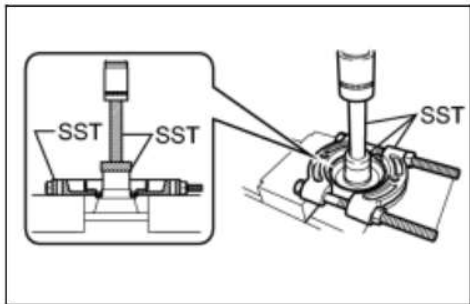
NOTICE:

Apply grease to the threads of SST center bolt before use.

15. REMOVE REAR DIFFERENTIAL DUST DEFLECTOR

HINT:

Perform this procedure only when the rear differential dust deflector is damaged.



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

SST: 09950-00020

SST: 09950-60010

09951-00380

SST: 09950-70010

09951-07100

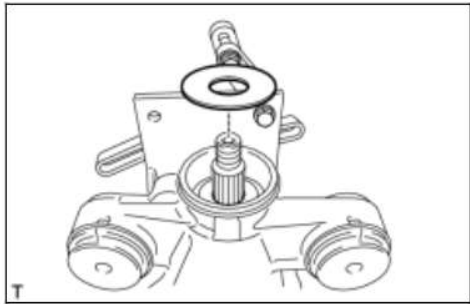
NOTICE:

Do not drop the rear drive pinion companion flange.

16. REMOVE REAR DIFFERENTIAL CARRIER OIL SEAL

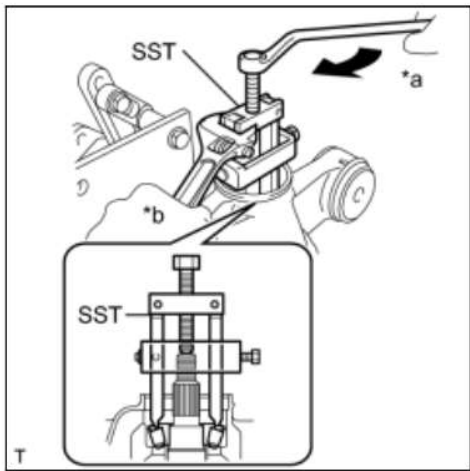
INFO

17. REMOVE REAR DIFFERENTIAL DRIVE PINION OIL SLINGER



(a) Remove the rear differential drive pinion oil slinger.

18. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING



(a) Using SST, remove the rear drive pinion front tapered roller bearing (inner race) from the differential drive pinion.

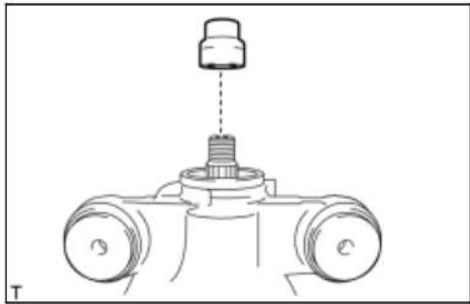
SST: 09556-22010

Text in Illustration

|    |      |
|----|------|
| *a | Turn |
| *b | Hold |

**NOTICE:**  
Apply grease to the threads and tip of SST center bolt before use.

19. REMOVE REAR DIFFERENTIAL DRIVE PINION BEARING SPACER



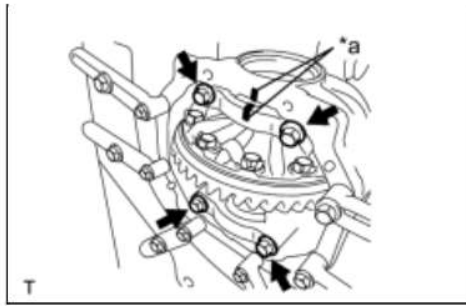
(a) Remove the rear differential drive pinion bearing spacer.

20. REMOVE REAR DIFFERENTIAL CASE SUB-ASSEMBLY

(a) Put matchmarks on either bearing cap and the rear differential carrier sub-assembly.

Text in Illustration





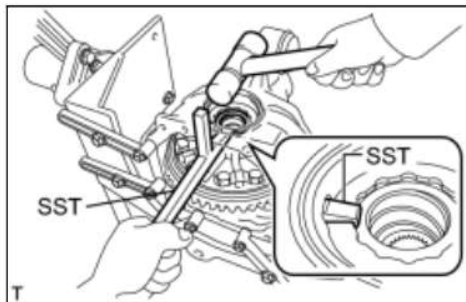
\*a

Matchmark

(b) Remove the 4 bolts and 2 bearing caps from the rear differential carrier sub-assembly.

**NOTICE:**

Do not exchange bearing caps, as each cap is only suitable for its original location and the installation direction relative to the rear differential carrier sub-assembly for which it was manufactured.



(c) Using SST and a hammer, remove the 2 rear differential side gear shaft plate washers.

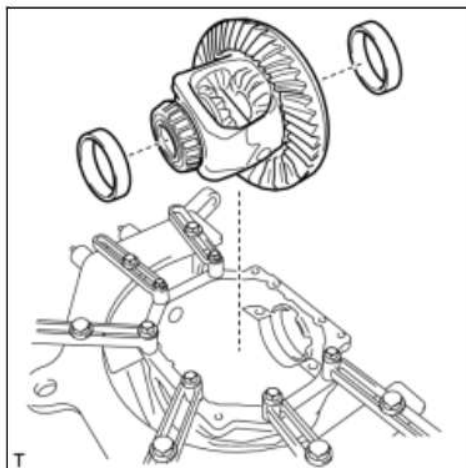
**SST: 09504-22011**

**NOTICE:**

Put identification marks on the rear differential side gear shaft plate washers to show the location for installation (differential ring gear back side or differential ring gear teeth side), or keep them separate so that they can be distinguished.

**HINT:**

Measure the thickness of each rear differential side gear shaft plate washer and note it.



(d) Remove the rear differential case sub-assembly and the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side from the rear differential carrier.

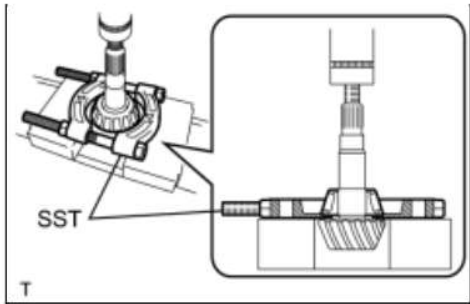
**NOTICE:**

- Do not damage the rear differential case bearing or the differential ring gear.
- Put identification marks on the rear differential case bearing outer races to show the location for installation (back side or teeth side), or keep them separate so that they can be distinguished.

## 21. REMOVE REAR DRIVE PINION REAR TAPERED ROLLER BEARING

(a) Remove the differential drive pinion from the rear differential carrier sub-assembly.

(b) Using SST and a press, remove the rear drive pinion rear tapered roller bearing (inner race) from the differential



drive pinion.

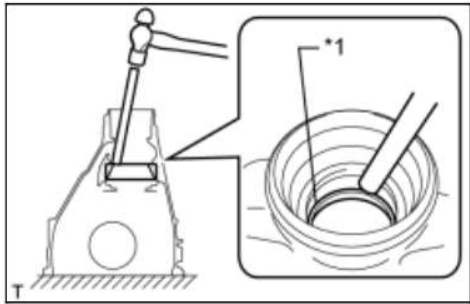
**SST: 09950-00020**

**NOTICE:**  
Do not drop the differential drive pinion.

**HINT:**  
If either the differential drive pinion or differential ring gear is damaged, replace both as a set.

(c) Remove the rear differential drive pinion plate washer from the differential drive pinion.

**HINT:**  
Measure the thickness of the rear differential drive pinion plate washer and note it.



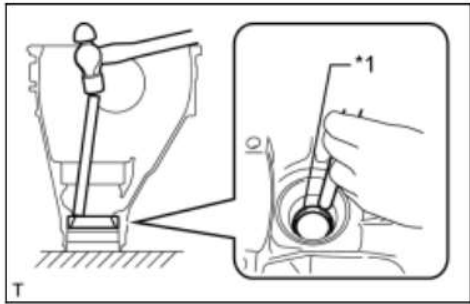
(d) Using a brass bar and a hammer, remove the rear drive pinion rear tapered roller bearing (outer race) from the rear differential carrier sub-assembly.

**Text in Illustration**

|    |            |
|----|------------|
| *1 | Outer Race |
|----|------------|

**NOTICE:**  
Place the brass bar onto the rear drive pinion rear tapered roller bearing outer race. Do not damage the rear differential carrier.

**22. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING**



(a) Using a brass bar and a hammer, remove the rear drive pinion front tapered roller bearing (outer race) from the rear differential carrier sub-assembly.

**Text in Illustration**

|    |            |
|----|------------|
| *1 | Outer Race |
|----|------------|

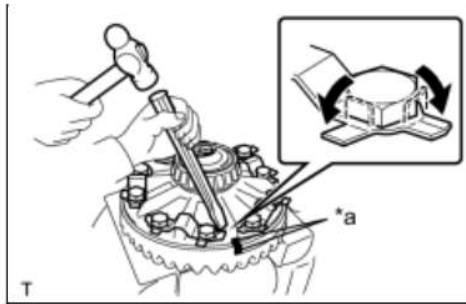
**NOTICE:**  
Place the brass bar onto the rear drive pinion front tapered roller bearing outer race. Do not damage the rear differential carrier sub-assembly.

**23. REMOVE DIFFERENTIAL RING GEAR**

(a) Hold the rear differential case sub-assembly in a vise between aluminum plates.

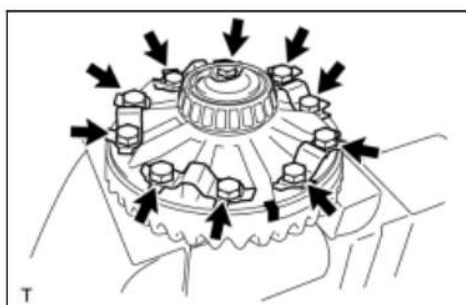
**Text in Illustration**

|    |           |
|----|-----------|
| *a | Matchmark |
|----|-----------|

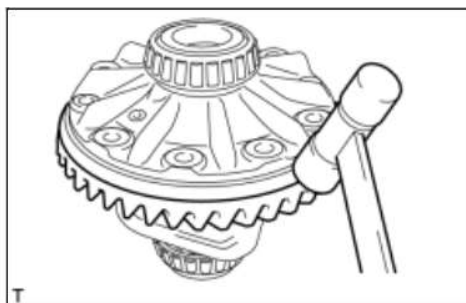
**NOTICE:**

Do not overtighten the vise.

- (b) Put matchmarks on the differential ring gear and the rear differential case sub-assembly.  
 (c) Using a chisel and hammer, unstake the 5 rear differential ring gear set bolt lock plates.



- (d) Remove the 10 rear differential ring gear set bolts and the 5 rear differential ring gear set bolt lock plates.



- (e) Using a plastic-faced hammer, tap on the differential ring gear to separate it from the rear differential case sub-assembly.

**NOTICE:**

Do not damage the differential ring gear.

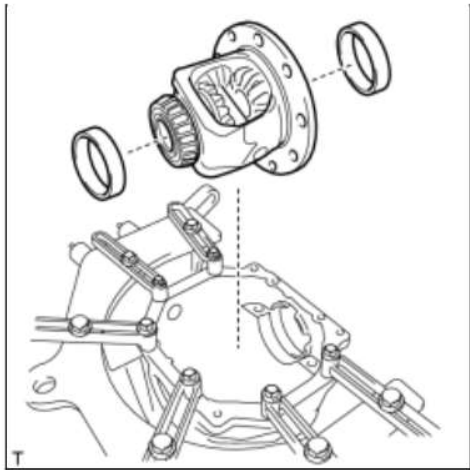
## 24. INSPECT RUNOUT OF REAR DIFFERENTIAL CASE SUB-ASSEMBLY

**HINT:**

Perform this procedure only when the runout of the differential ring gear exceeds the specified maximum value.

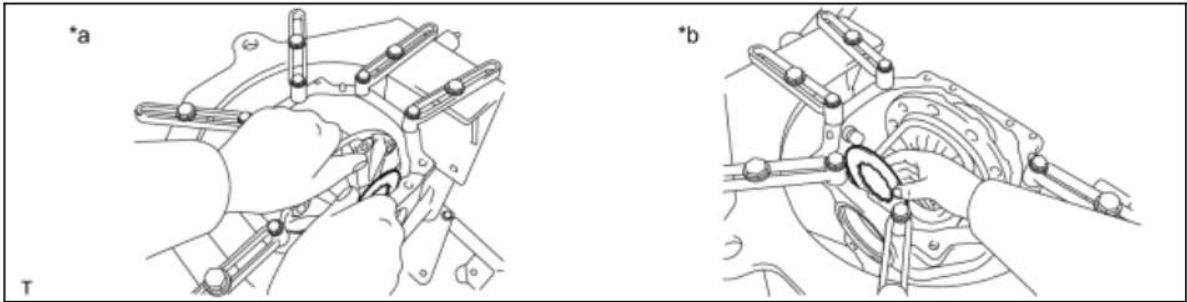
- (a) Install the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side to the rear differential case bearing inner races LH and RH respectively.

**NOTICE:**



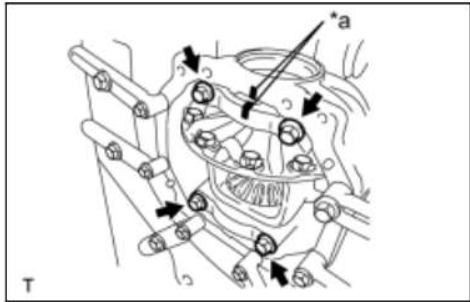
- Be sure to install the rear differential case bearing outer races in the correct position.
- Do not damage the rear differential case bearing or differential ring gear.

- (b) Install the rear differential case sub-assembly to the rear differential carrier sub-assembly.
- (c) Install the differential ring gear back side and differential ring gear teeth side rear differential side gear shaft plate washers so that there is no looseness in the rear differential case bearings.



**Text in Illustration**

|    |                                  |    |                                   |
|----|----------------------------------|----|-----------------------------------|
| *a | Differential Ring Gear Back Side | *b | Differential Ring Gear Teeth Side |
|----|----------------------------------|----|-----------------------------------|



- (d) Align the matchmarks on the bearing cap and the rear differential carrier sub-assembly and install the 2 bearing caps.

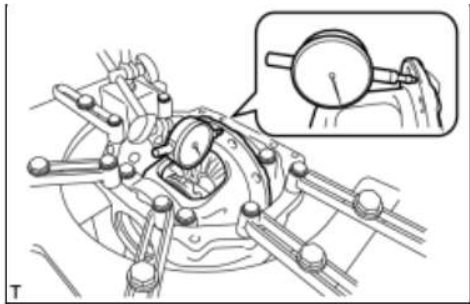
**Text in Illustration**

|    |           |
|----|-----------|
| *a | Matchmark |
|----|-----------|

**NOTICE:**  
Make sure that the right and left bearing caps are not interchanged.

- (e) Tighten both bearing caps with the 4 bolts.
- Torque: 85 N·m (867 kgf·cm, 63ft·lbf)**

- (f) Using a dial indicator, measure the rear differential case sub-assembly runout.



Maximum runout:  
0.07 mm (0.00275 in.)

If the runout is more than the maximum value, replace the rear differential case sub-assembly with a new one.

(g) Remove the 4 bolts and 2 bearing caps.

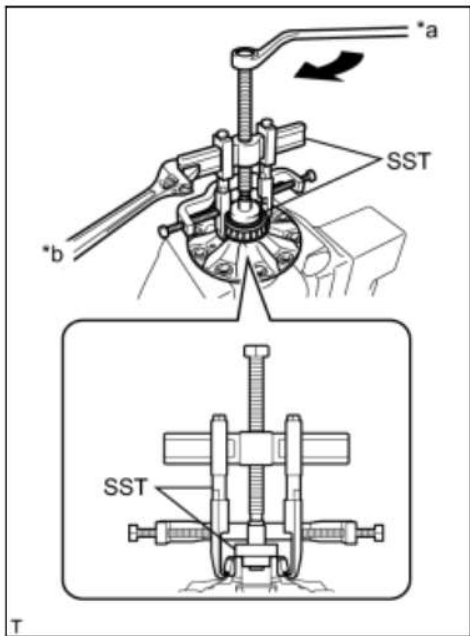
**NOTICE:**  
Do not exchange bearing caps, as each cap is only suitable for its original location and the installation direction relative to the carrier for which it was manufactured.

(h) Remove the rear differential case sub-assembly and the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side from the rear differential carrier sub-assembly.

**NOTICE:**  
Do not damage the rear differential case bearing or differential ring gear.

25. REMOVE REAR DIFFERENTIAL CASE BEARING

**HINT:**  
Perform this procedure only when replacing the rear differential case bearing or rear differential case sub-assembly.



(a) Hold the rear differential case sub-assembly in a vise between aluminum plates.

Text in Illustration

|    |      |
|----|------|
| *a | Turn |
| *b | Hold |

**NOTICE:**  
Do not overtighten the vise.

(b) Using SST, remove the rear differential case bearing inner races LH and RH from the rear differential case sub-assembly.

**SST: 09950-40011**  
09951-04020

09952-04010

09953-04030

09954-04010

09955-04061

09957-04010

09958-04011

**SST: 09950-60010**

09951-00350

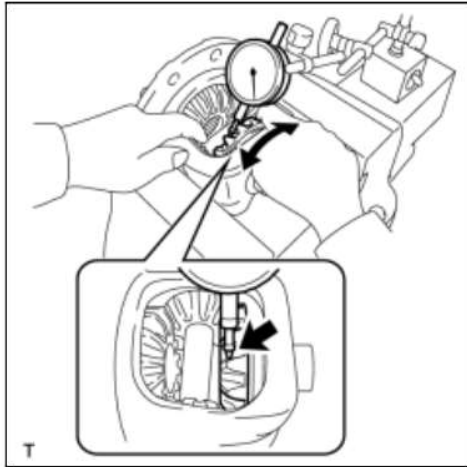
09951-00480

09952-06010

**NOTICE:**

- Do not deform the bearing cage if the bearing is to be reused.
- Hook the claws of SST to the rear differential case bearing inner race.
- Apply grease to the threads and tip of SST center bolt before use.

**26. INSPECT DIFFERENTIAL SIDE GEAR BACKLASH**



- (a) Secure the rear differential case sub-assembly in a vise between aluminum plates.

**NOTICE:**

**Do not overtighten the vise.**

- (b) Place a dial indicator on the tip of a side gear tooth at a right angle. Hold the pinion gear in the rear differential case sub-assembly and check that the backlash.

Standard Backlash:

0 mm (0 in.)

If the result is not as specified, replace the rear differential case sub-assembly with a new one.



|                                                                                                   |                    |                                |
|---------------------------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                                                   | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                                           | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000O5701QX |
| <b>Title:</b> AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER ASSEMBLY: INSTALLATION (2013 FR-S) |                    |                                |

## INSTALLATION

### 1. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY

- Support the rear differential carrier assembly using a jack.
- Install a new snap ring to the rear drive shaft assembly.
- Coat the spline of the inboard joint shaft assembly with toyota genuine differential gear oil LT 75W-85 GL-5 (except LSD).
- Coat the spline of the inboard joint shaft assembly with toyota genuine differential gear oil LX 75W-85 GL-5 (for LSD).
- Install the shaft snap ring with the opening facing downward.
- Align the shaft splines and install the drive shaft assembly with a brass bar and hammer.

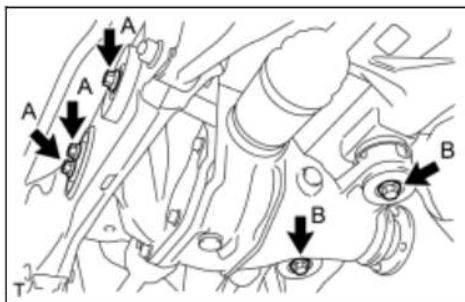
#### NOTICE:

- Be careful not to damage the drive shaft dust cover, boot or oil seal.
- Keep the drive shaft assembly level while handling it.
- Do not tap the axle side of the drive shaft with the hammer.
- Set the hole snap ring with the opening facing down word.

#### HINT:

Whether the inboard joint shaft is in contact with the pinion shaft or not can be confirmed from the sound or feeling when tapping it in.

- Install the rear upper differential mount stopper and rear lower differential mount stopper to the rear differential carrier assembly.



- Install the rear differential carrier assembly along with the rear differential mount stopper with the 5 bolts.

**A - Torque: 62 N·m (632 kgf·cm, 46ft·lbf)**

**B - Torque: 95 N·m (969 kgf·cm, 70ft·lbf)**

### 2. INSTALL PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY

INFO

### 3. INSTALL CENTER EXHAUST PIPE ASSEMBLY

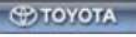
INFO

### 4. ADD DIFFERENTIAL OIL

INFO

### 5. INSTALL REAR WHEEL

**Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)**

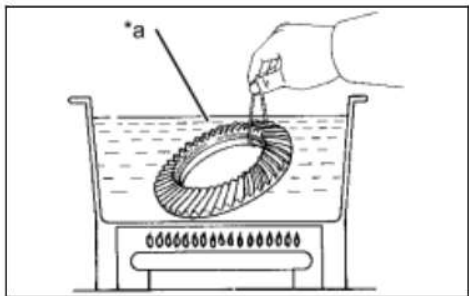


|                                                                                          |             |                         |
|------------------------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                                 | 6.4 A       | From: 201203            |
| Model Year: 2013                                                                         | Model: FR-S | Doc ID: RM000000O5A01DX |
| Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER ASSEMBLY: REASSEMBLY (2013 FR-S) |             |                         |

REASSEMBLY

1. INSTALL DIFFERENTIAL RING GEAR

- (a) Clean the contact surfaces of the rear differential case sub-assembly and differential ring gear.
- (b) Clean the rear differential ring gear set bolt hole.



- (c) Heat the differential ring gear to approximately 100°C (212°F) in boiling water.

Text in Illustration

|    |               |
|----|---------------|
| *a | Boiling Water |
|----|---------------|

- (d) Carefully take the differential ring gear out of the boiling water.

CAUTION:

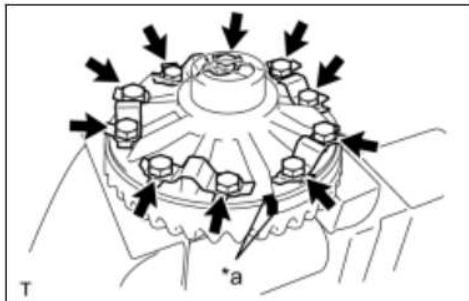
Use thick gloves to protect your hands as the differential ring gear is hot.

- (e) Secure the rear differential case sub-assembly between aluminum plates in a vise.

NOTICE:

Do not overtighten the vise.

- (f) After the moisture on the differential ring gear has completely evaporated, quickly install the differential ring gear to the rear differential case sub-assembly.



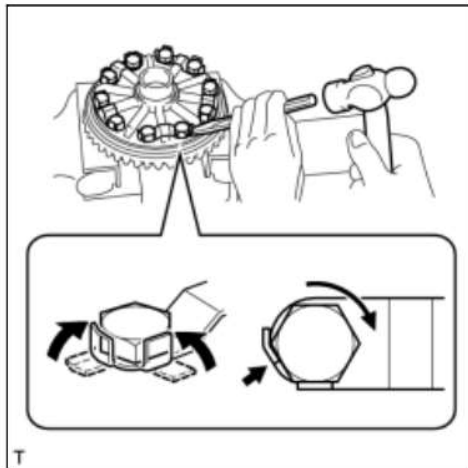
- (g) Align the matchmarks on the differential ring gear and rear differential case sub-assembly.

Text in Illustration

|    |           |
|----|-----------|
| *a | Matchmark |
|----|-----------|

- (h) Temporarily install 5 new rear differential ring gear set bolt lock plates with the 10 rear differential ring gear set bolts.
- (i) After the differential ring gear cools down, tighten the 10 ring gear set bolts uniformly.

**Torque: 97 N·m (984 kgf·cm, 71ft·lbf)**



- (j) Using a chisel and hammer, stake the 5 rear differential ring gear set bolt lock plates.
- (1) Stake one claw so that it is flush against the flat surface of the bolt.
  - (2) Stake the other claw against the surface of the bolt head to act as a stopper if the bolt starts to loosen.

## 2. INSTALL REAR DIFFERENTIAL CASE BEARING

- (a) Using SST and a press, install the rear differential case bearing inner races LH and RH to the rear differential case sub-assembly.

**SST: 09710-30012**

09710-04081

**SST: 09950-60010**

09951-00430

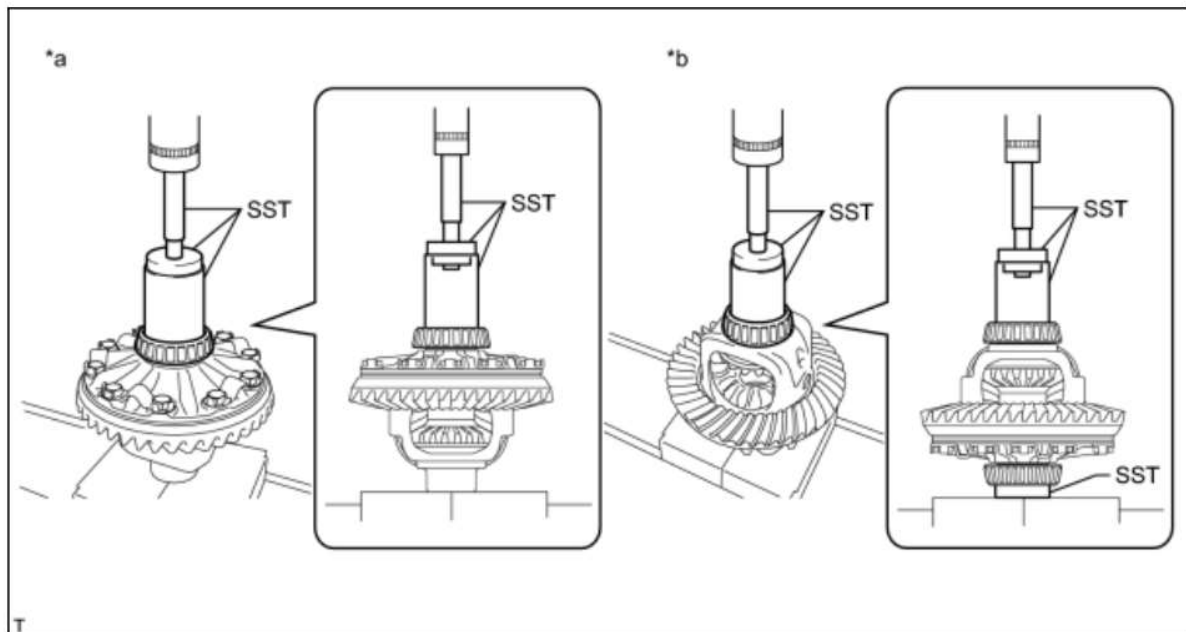
09951-00580

09951-00590

09952-06010

**SST: 09950-70010**

09951-07100



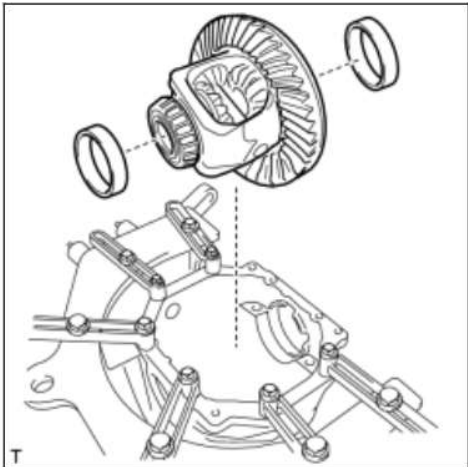
**Text in Illustration**

|    |         |    |         |
|----|---------|----|---------|
| *a | LH Side | *b | RH Side |
|----|---------|----|---------|

**NOTICE:**

- Do not apply hypoid gear oil to a new bearing.
- Do not deform the bearing cage. Set SST to the center of the rear differential case sub-assembly.
- If the bearing is replaced, replace it and its outer race as a set.

**3. INSPECT RUNOUT OF DIFFERENTIAL RING GEAR**

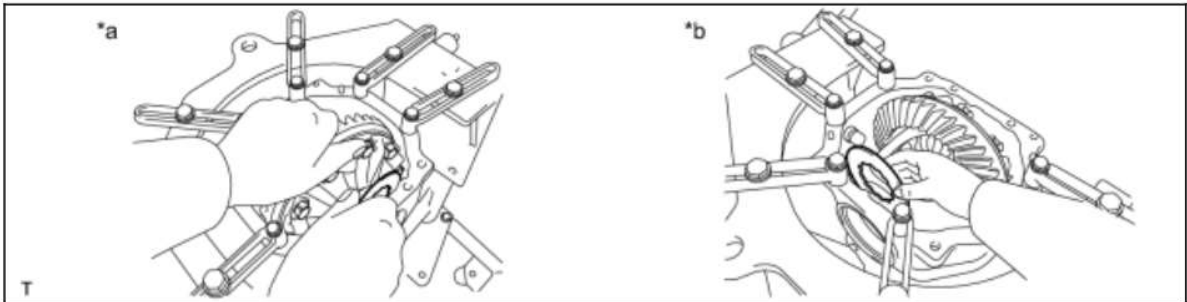


- (a) Install the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side to the rear differential case bearing inner races LH and RH respectively.

**NOTICE:**

- Be sure to install the rear differential case bearing outer races in the correct position.
- Do not damage the rear differential case bearing or differential ring gear.

- (b) Install the rear differential case sub-assembly to the rear differential carrier.
- (c) Install the differential ring gear back side and differential ring gear teeth side rear differential side gear shaft plate washers so that there is no looseness in the rear differential case bearings.



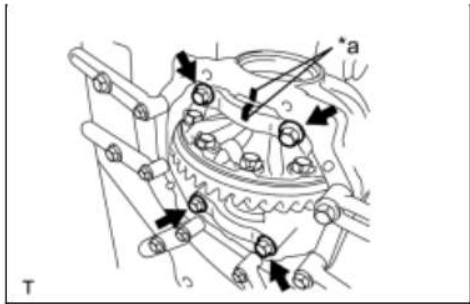
**Text in Illustration**

|    |                                  |    |                                   |
|----|----------------------------------|----|-----------------------------------|
| *a | Differential Ring Gear Back Side | *b | Differential Ring Gear Teeth Side |
|----|----------------------------------|----|-----------------------------------|

**HINT:**

- If the rear differential case bearing is new, select a thinner rear differential side gear shaft plate washer and install it.
- If the rear differential case bearing is reused, install a rear differential side gear shaft plate washer with the same thickness as the removed one.

- (d) Align the matchmarks on the bearing cap and the rear



differential carrier and install the 2 bearing caps.

**Text in Illustration**

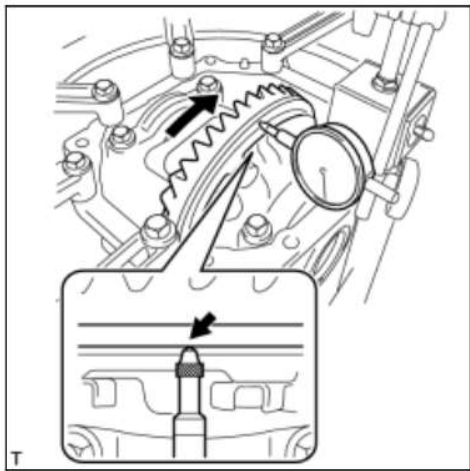
|    |           |
|----|-----------|
| *a | Matchmark |
|----|-----------|

**NOTICE:**

Make sure that the right and left bearing caps are not interchanged.

(e) Tighten both bearing caps with the 4 bolts.

**Torque: 85 N·m (870 kgf·cm, 63ft·lbf)**



(f) Using a dial indicator, measure the runout of the differential ring gear.

Maximum runout:  
0.07 mm (0.00275 in.)

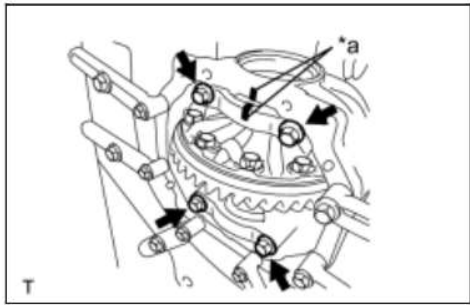
(g) Remove the 4 bolts and 2 bearing caps.

**Text in Illustration**

|    |           |
|----|-----------|
| *a | Matchmark |
|----|-----------|

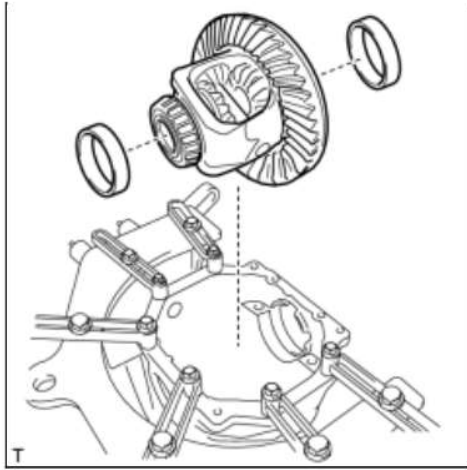
**NOTICE:**

Do not exchange bearing caps, as each cap is only suitable for its original location and the installation direction relative to the carrier for which it was manufactured.



(h) Remove the 2 rear differential side gear shaft plate washers.

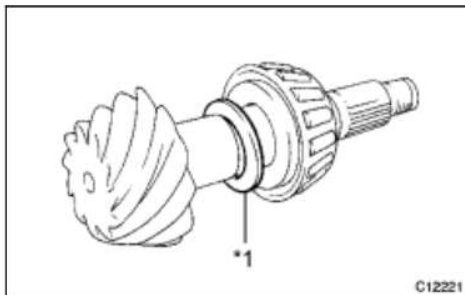
(i) Remove the rear differential case sub-assembly and the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side from the rear differential carrier.

**NOTICE:**

Do not damage the rear differential case bearing or differential ring gear.

#### 4. INSTALL REAR DRIVE PINION REAR TAPERED ROLLER BEARING

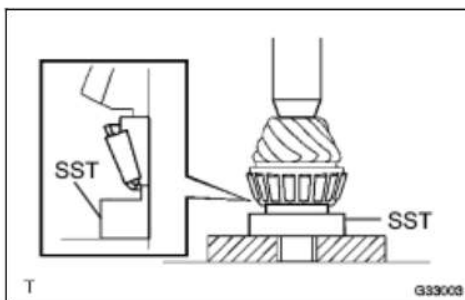
- (a) Install the rear differential drive pinion plate washer to the differential drive pinion.

**Text in Illustration**

|    |                                             |
|----|---------------------------------------------|
| *1 | Rear Differential Drive Pinion Plate Washer |
|----|---------------------------------------------|

**HINT:**

- Temporarily install the rear drive pinion rear tapered roller bearing (inner race) to prevent the rear differential drive pinion plate washer from being dropped.
- The rear differential drive pinion plate washer can be installed in either direction.



- (b) Using SST and a press, install the rear drive pinion rear tapered roller bearing (inner race) to the differential drive pinion.

**SST: 09506-30012**

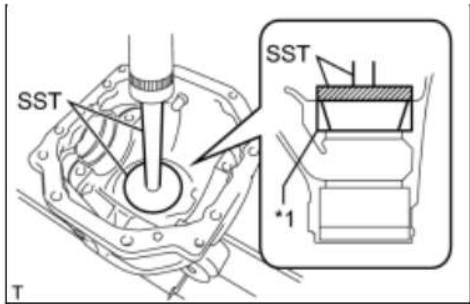
- (c) Using SST and a press, install the rear drive pinion rear tapered roller bearing (outer race) to the differential carrier assembly rear.

**SST: 09950-60020**

09951-00890

**SST: 09950-70010**

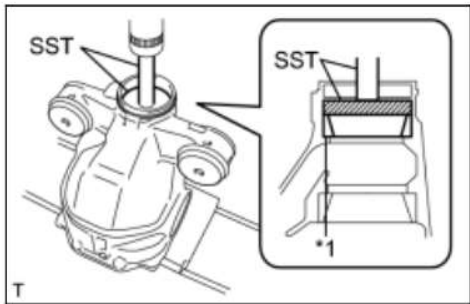
09951-07200



Text in Illustration

|    |                                                            |
|----|------------------------------------------------------------|
| *1 | Rear Drive Pinion Rear Tapered Roller Bearing (Outer Race) |
|----|------------------------------------------------------------|

5. INSTALL REAR DRIVE PINION FRONT TAPERED ROLLER BEARING



- (a) Using SST and a press, install the rear drive pinion front tapered roller bearing (outer race) to the differential carrier assembly rear.

SST: 09950-60020

09951-00720

SST: 09950-70010

09951-07100

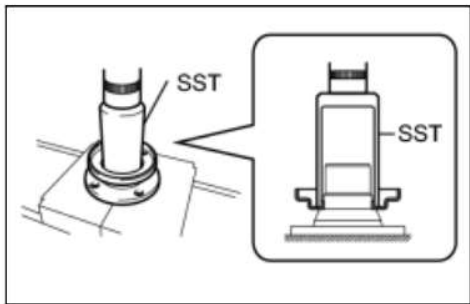
Text in Illustration

|    |                                                             |
|----|-------------------------------------------------------------|
| *1 | Rear Drive Pinion Front Tapered Roller Bearing (Outer Race) |
|----|-------------------------------------------------------------|

6. INSTALL REAR DIFFERENTIAL DUST DEFLECTOR

HINT:

Perform this procedure only when replacing the rear differential dust deflector.



- (a) Using SST and a press, install a new rear differential dust deflector to the rear drive pinion companion flange.

SST: 09636-20010

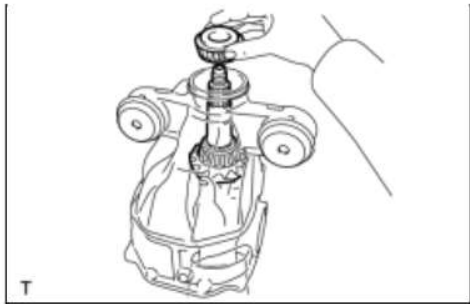
NOTICE:

- Slowly press in the rear differential dust deflector.
- If any burrs remain after pressing in the rear differential dust deflector, remove them.

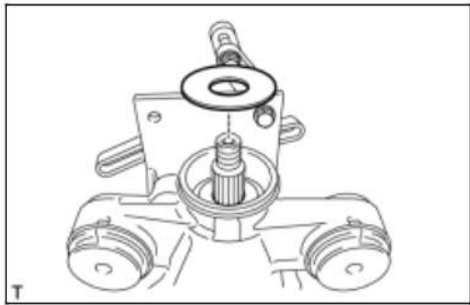
7. ADJUST DIFFERENTIAL DRIVE PINION PRELOAD

- (a) Install the differential drive pinion and the rear drive pinion front tapered roller bearing (inner race) to the differential carrier assembly rear.

NOTICE:



- Do not drop the differential drive pinion.
- Install the rear differential drive pinion bearing spacer and the differential carrier assembly rear oil seal after adjusting the tooth contact pattern.

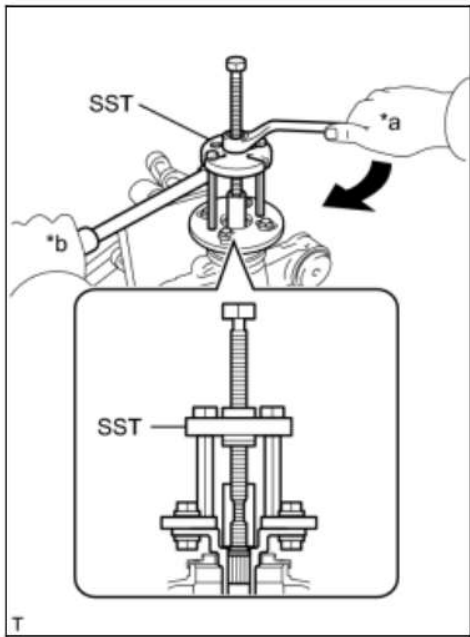


(b) Install the rear differential drive pinion oil slinger to the differential carrier assembly rear.

(c) Using SST, install the rear drive pinion companion flange to the differential carrier assembly rear.

**Text in Illustration**

|    |      |
|----|------|
| *a | Turn |
| *b | Hold |



**SST: 09950-30012**

09951-03010  
09953-03010  
09954-03010  
09955-03030  
09956-03030

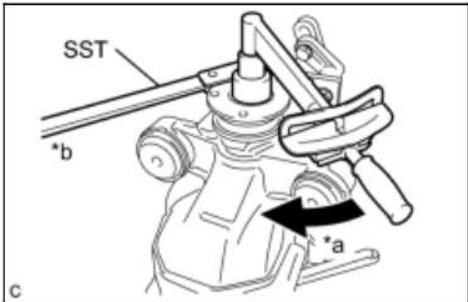
**NOTICE:**

- Hold the differential drive pinion until SST is installed.
- Install the rear drive pinion companion flange so that there is a slight looseness in the differential drive pinion because the rear differential drive pinion bearing spacer is not yet installed.
- Apply grease to the threads and tip of SST center bolt before use.

(d) Coat the threads of a new rear drive pinion nut with hypoid gear oil LSD.

(e) Using SST and a torque wrench, hold the rear drive pinion companion flange and tighten the rear drive pinion nut.

Text in Illustration



|    |      |
|----|------|
| *a | Turn |
| *b | Hold |

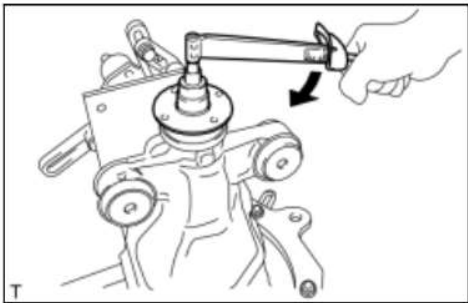
**SST: 09330-00021**  
**Torque: 338 N·m (3445 kgf·cm, 249ft·lbf) or less**

- NOTICE:**
- Tighten the rear drive pinion nut to approximately 100 N·m (1020 kgf·cm, 74 ft.\*lbf), and then tighten it further while checking the differential drive pinion preload.
  - Apply hypoid gear oil LSD to the rear drive pinion nut and the threads of the differential drive pinion.
  - As there is no rear differential drive pinion bearing spacer, tighten the rear drive pinion nut a little at a time. Do not overtighten it.

(f) Turn the bearing clockwise and counterclockwise several times to stabilize it.

(g) Using a torque wrench, measure the starting torque of the differential drive pinion.

- HINT:**
- The backlash between the differential drive pinion and differential ring gear should allow enough movement of the differential drive pinion to allow this measurement to be performed.
  - Make sure not to include the preload of the differential ring gear (rear differential case sub-assembly) in the measurement of the differential drive pinion preload.



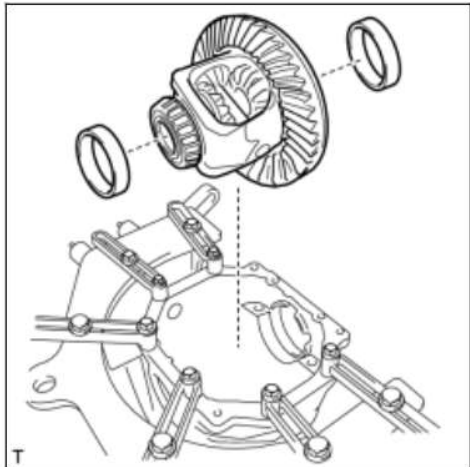
Differential Drive Pinion Preload (at Starting):

| ITEM                                            | SPECIFIED CONDITION                                          |
|-------------------------------------------------|--------------------------------------------------------------|
| New rear drive pinion tapered roller bearing    | 1.39 to 2.49 N·m (14.2 to 25.4 kgf·cm, 12.3 to 22.0 in.*lbf) |
| Reused rear drive pinion tapered roller bearing | 1.01 to 1.81 N·m (10.3 to 18.5 kgf·cm, 8.9 to 16.0 in.*lbf)  |

- NOTICE:**
- Record the differential drive pinion preload for the total preload measurement.
  - Do not apply hypoid gear oil to a new rear drive pinion tapered roller bearing.

If the preload is not within the specified range, adjust the differential drive pinion preload or perform repairs as necessary.

8. INSTALL REAR DIFFERENTIAL CASE SUB-ASSEMBLY

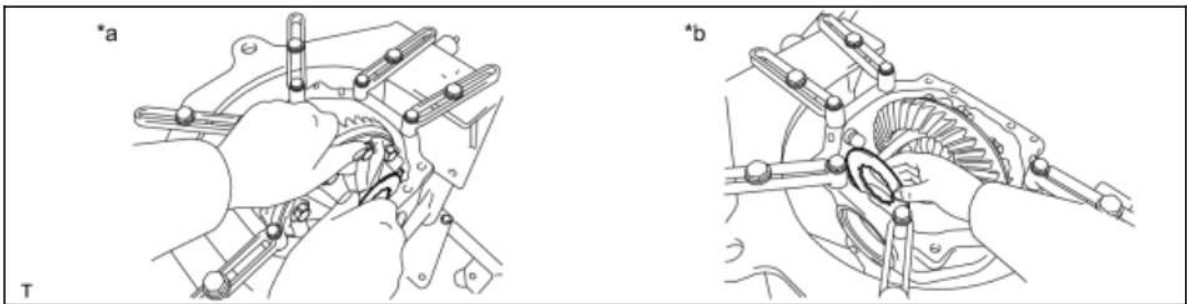


- (a) Install the rear differential case bearing outer races differential ring gear back side and differential ring gear teeth side to the rear differential case bearing inner races LH and RH respectively.

**NOTICE:**

- Be sure to install the rear differential case bearing outer races in the correct position.
- Do not damage the rear differential case bearing or differential ring gear.

- (b) Install the rear differential case sub-assembly to the differential carrier assembly rear.
- (c) Install the differential ring gear back side and differential ring gear teeth side rear differential side gear shaft plate washers so that the rear differential case bearing is not loose.



**Text in Illustration**

|    |                                  |    |                                   |
|----|----------------------------------|----|-----------------------------------|
| *a | Differential Ring Gear Back Side | *b | Differential Ring Gear Teeth Side |
|----|----------------------------------|----|-----------------------------------|

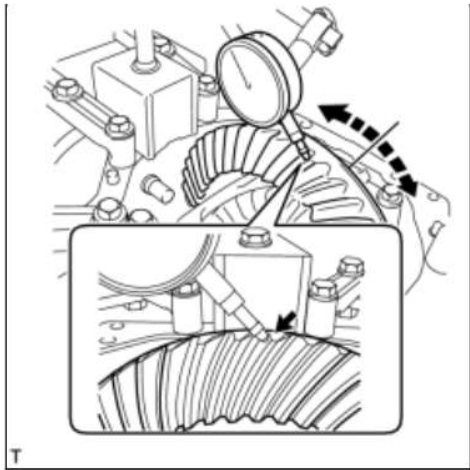
**HINT:**

- If the final gear set (differential drive pinion and differential ring gear) and rear differential case bearing are new, select a thinner rear differential side gear shaft plate washer and install it.
- If the final gear set (differential drive pinion and differential ring gear) and rear differential case bearing are reused, install a rear differential side gear shaft plate washer with the same thickness as the removed one.

9. INSPECT AND ADJUST DIFFERENTIAL RING GEAR BACKLASH

- (a) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

Standard Backlash:  
0.13 to 0.18 mm (0.00512 to 0.00708 in.)



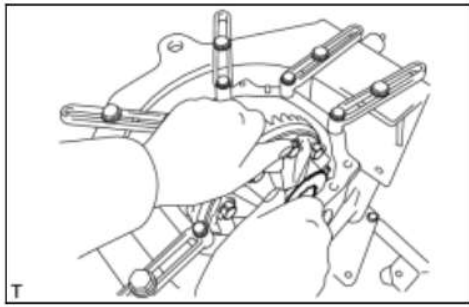
**HINT:**

- Record the measured backlash to use as a reference for selecting a rear differential side gear shaft plate washer.
- Inspect the tooth contact and use the result as a reference for selecting a rear differential side gear shaft plate washer.

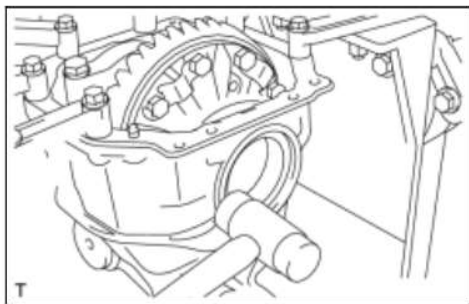
(b) Select a new rear differential side gear shaft plate washer so that the differential ring gear backlash will be within the specified range, and install it to the differential ring gear back side.

Standard Plate Washer:

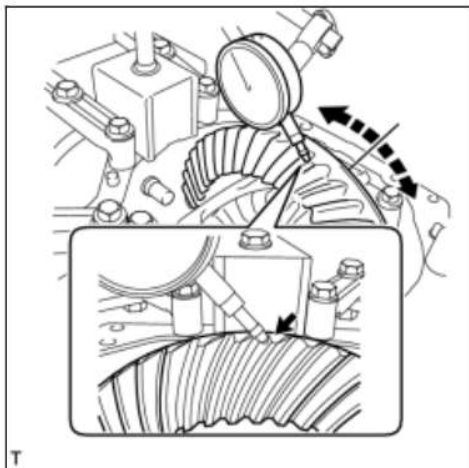
| PART NO.    | MARK | THICKNESS               | PART NO.    | MARK | THICKNESS               |
|-------------|------|-------------------------|-------------|------|-------------------------|
| 90201-52001 | 01   | 2.58 mm<br>(0.1016 in.) | 90564-46029 | 47   | 3.04 mm<br>(0.1200 in.) |
| 90564-46014 | 32   | 2.60 mm<br>(0.1024 in.) | 90201-52017 | 17   | 3.06 mm<br>(0.1205 in.) |
| 90564-46015 | 33   | 2.62 mm<br>(0.1031 in.) | 90564-46030 | 48   | 3.08 mm<br>(0.1213 in.) |
| 90201-52003 | 03   | 2.64 mm<br>(0.1039 in.) | 90564-46031 | 49   | 3.10 mm<br>(0.1221 in.) |
| 90564-46016 | 34   | 2.66 mm<br>(0.1047 in.) | 90201-52019 | 19   | 3.12 mm<br>(0.1228 in.) |
| 90564-46017 | 35   | 2.68 mm<br>(0.1055 in.) | 90564-46032 | 50   | 3.14 mm<br>(0.1236 in.) |
| 90201-52005 | 05   | 2.70 mm<br>(0.1063 in.) | 90564-46033 | 51   | 3.16 mm<br>(0.1244 in.) |
| 90564-46018 | 36   | 2.72 mm<br>(0.1070 in.) | 90201-52021 | 21   | 3.18 mm<br>(0.1252 in.) |
|             |      |                         |             |      | 3.20 mm                 |



|             |    |                         |             |    |                         |
|-------------|----|-------------------------|-------------|----|-------------------------|
| 90564-46019 | 37 | 2.74 mm<br>(0.1078 in.) | 90564-46034 | 52 | (0.1260 in.)            |
| 90201-52007 | 07 | 2.76 mm<br>(0.1087 in.) | 90564-46035 | 53 | 3.22 mm<br>(0.1268 in.) |
| 90564-46020 | 38 | 2.78 mm<br>(0.1094 in.) | 90201-52023 | 23 | 3.24 mm<br>(0.1276 in.) |
| 90564-46021 | 39 | 2.80 mm<br>(0.1102 in.) | 90564-46036 | 54 | 3.26 mm<br>(0.1283 in.) |
| 90201-52009 | 09 | 2.82 mm<br>(0.1110 in.) | 90564-46037 | 55 | 3.28 mm<br>(0.1291 in.) |
| 90564-46022 | 40 | 2.84 mm<br>(0.1118 in.) | 90201-52025 | 25 | 3.30 mm<br>(0.1299 in.) |
| 90564-46023 | 41 | 2.86 mm<br>(0.1126 in.) | 90564-46038 | 56 | 3.32 mm<br>(0.1307 in.) |
| 90201-52011 | 11 | 2.88 mm<br>(0.1134 in.) | 90564-46039 | 57 | 3.34 mm<br>(0.1315 in.) |
| 90564-46024 | 42 | 2.90 mm<br>(0.1142 in.) | 90201-52027 | 27 | 3.36 mm<br>(0.1323 in.) |
| 90564-46025 | 43 | 2.92 mm<br>(0.1150 in.) | 90564-46040 | 58 | 3.38 mm<br>(0.1331 in.) |
| 90201-52013 | 13 | 2.94 mm<br>(0.1157 in.) | 90564-46041 | 59 | 3.40 mm<br>(0.1339 in.) |
| 90564-46026 | 44 | 2.96 mm<br>(0.1165 in.) | 90201-52029 | 29 | 3.42 mm<br>(0.1346 in.) |
| 90564-46027 | 45 | 2.98 mm<br>(0.1173 in.) | 90564-46042 | 60 | 3.44 mm<br>(0.1354 in.) |
| 90201-52015 | 15 | 3.00 mm<br>(0.1181 in.) | 90564-46043 | 61 | 3.46 mm<br>(0.1362 in.) |
| 90564-46028 | 46 | 3.02 mm<br>(0.1189 in.) | 90201-52031 | 31 | 3.48 mm<br>(0.1370 in.) |



- (c) Make the rear differential case bearing and the rear differential side gear shaft plate washer snug by tapping on the rear differential carrier with a plastic-faced hammer.

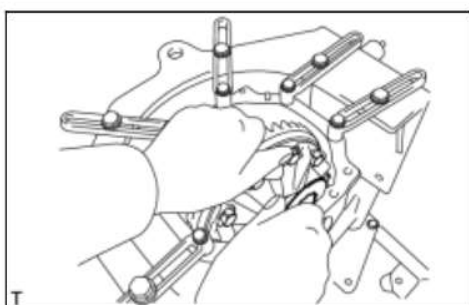


- (d) Set a dial indicator perpendicular to the end of the differential ring gear face.

- (e) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

Standard Backlash:

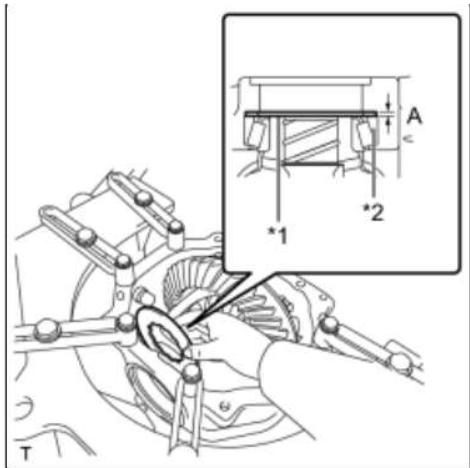
0.13 to 0.18 mm (0.00512 to 0.00708 in.)



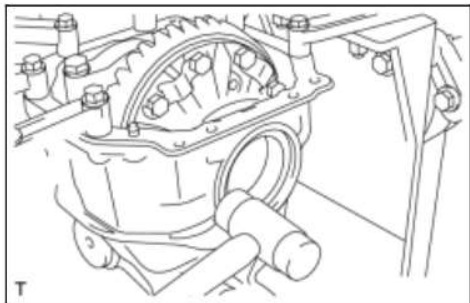
- (f) If the backlash is not within the specified range, select a new rear differential side gear shaft plate washer so that the differential ring gear backlash will be within the specified range, and install it to the differential ring gear back side.

- (g) Select a thicker rear differential side gear shaft plate washer so that the clearance (A) becomes zero or close to zero.

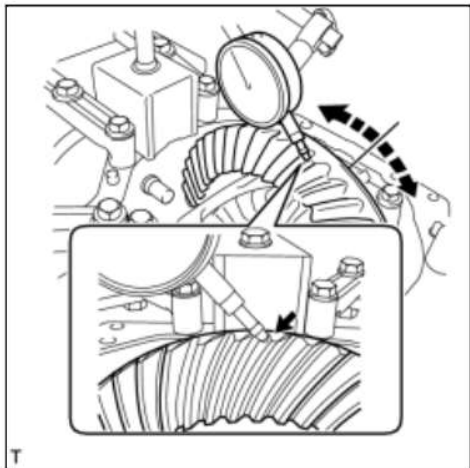
**Text in Illustration**



|    |                                                |
|----|------------------------------------------------|
| *1 | Rear Differential Side Gear Shaft Plate Washer |
| *2 | Rear Differential Case Bearing LH              |



(h) Make the rear differential case bearing and the rear differential side gear shaft plate washer snug by tapping on the rear differential carrier with a plastic-faced hammer.



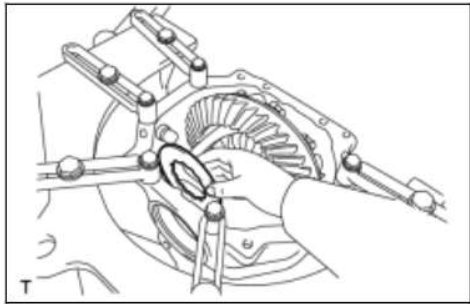
(i) Set a dial indicator perpendicular to the end of the differential ring gear face.

(j) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

Standard Backlash:  
0.13 to 0.18 mm (0.00512 to 0.00708 in.)

If the backlash is not within the specified range, adjust the thickness of the right and left rear differential side gear shaft plate washers by an equal amount so that the backlash is within the specified range.

10. ADJUST REAR DIFFERENTIAL CASE BEARING PRELOAD



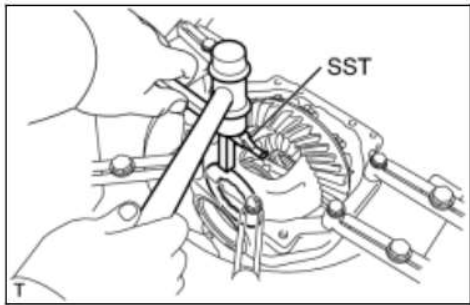
(a) After adjusting the backlash of the differential ring gear, remove the differential ring gear teeth side rear differential side gear shaft plate washer.

(b) Using a micrometer, measure the thickness of the removed rear differential side gear shaft plate washer.

(c) Select a new rear differential side gear shaft plate washer which is 0.06 to 0.09 mm (0.00236 to 0.00354 in.) thicker than the removed one.

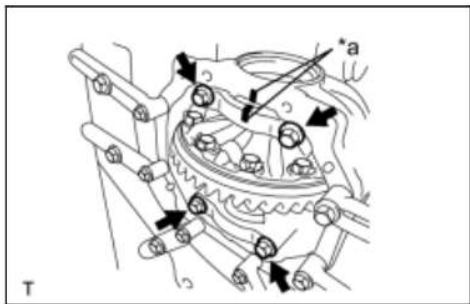
HINT:

Select a rear differential side gear shaft plate washer which can be pressed in 2/3 of the way with a finger.



(d) Using SST and a plastic-faced hammer, drive in the rear differential side gear shaft plate washer.

SST: 09504-22011



(e) Align the matchmarks on the bearing cap and rear differential carrier and install the 2 bearing caps.

Text in Illustration

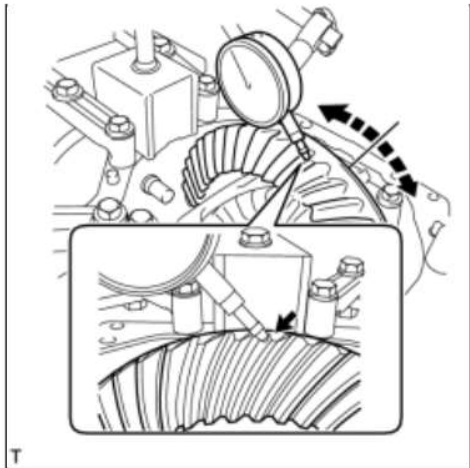
|    |           |
|----|-----------|
| *a | Matchmark |
|----|-----------|

NOTICE:

Make sure that the right and left bearing caps are not interchanged.

(f) Tighten both bearing caps with the 4 bolts.

Torque: 85 N·m (870 kgf·cm, 63ft·lbf)



(g) Set a dial indicator perpendicular to the end of the differential ring gear face.

(h) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

Standard Backlash:  
0.13 to 0.18 mm (0.00512 to 0.00708 in.)

If the measured value is out of the specified range, adjust it by increasing or decreasing the thickness of both the right and left rear differential side gear shaft plate washers equally.

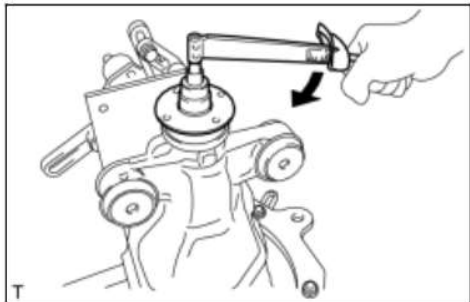
**HINT:**

- Record the measured backlash to use as a reference for selecting a rear differential side gear shaft plate washer.
- Inspect the tooth contact and use the result as a reference for selecting a rear differential side gear shaft plate washer.

**11. INSPECT TOTAL PRELOAD**

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

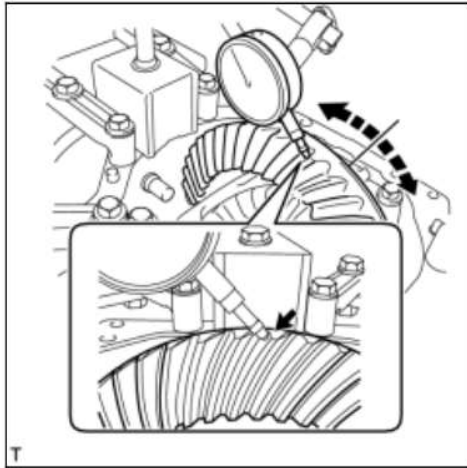
Total Preload (at Starting):



| ITEM                                            |                                  | SPECIFIED CONDITION                                          |
|-------------------------------------------------|----------------------------------|--------------------------------------------------------------|
| New rear drive pinion tapered roller bearing    | New differential case bearing    | 2.47 to 4.16 N*m (25.2 to 42.4 kgf*cm, 21.9 to 36.8 in.*lbf) |
|                                                 | Reused differential case bearing | 1.88 to 3.27 N*m (19.2 to 33.3 kgf*cm, 16.6 to 28.9 in.*lbf) |
| Reused rear drive pinion tapered roller bearing | New differential case bearing    | 2.09 to 3.48 N*m (21.3 to 35.5 kgf*cm, 18.5 to 30.8 in.*lbf) |
|                                                 | Reused differential case bearing | 1.50 to 2.59 N*m (15.3 to 26.4 kgf*cm, 13.3 to 22.9 in.*lbf) |

If the measured preload is less than the specified value, replace the rear differential side gear shaft plate washer of the differential ring gear tooth surface side with a new thicker one.

If the preload is more than the specified value, replace the rear differential side gear shaft plate washer of the differential ring gear tooth surface side with a new thinner one.



(b) Set a dial indicator to the end of the differential ring gear face.

(c) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

Standard Backlash:

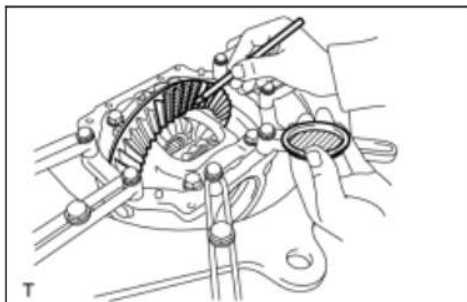
0.13 to 0.18 mm (0.00512 to 0.00708 in.)

If the backlash is not within the specified range, change the thickness of the right and left rear differential side gear shaft plate washers by equal amounts to adjust it.

#### **HINT:**

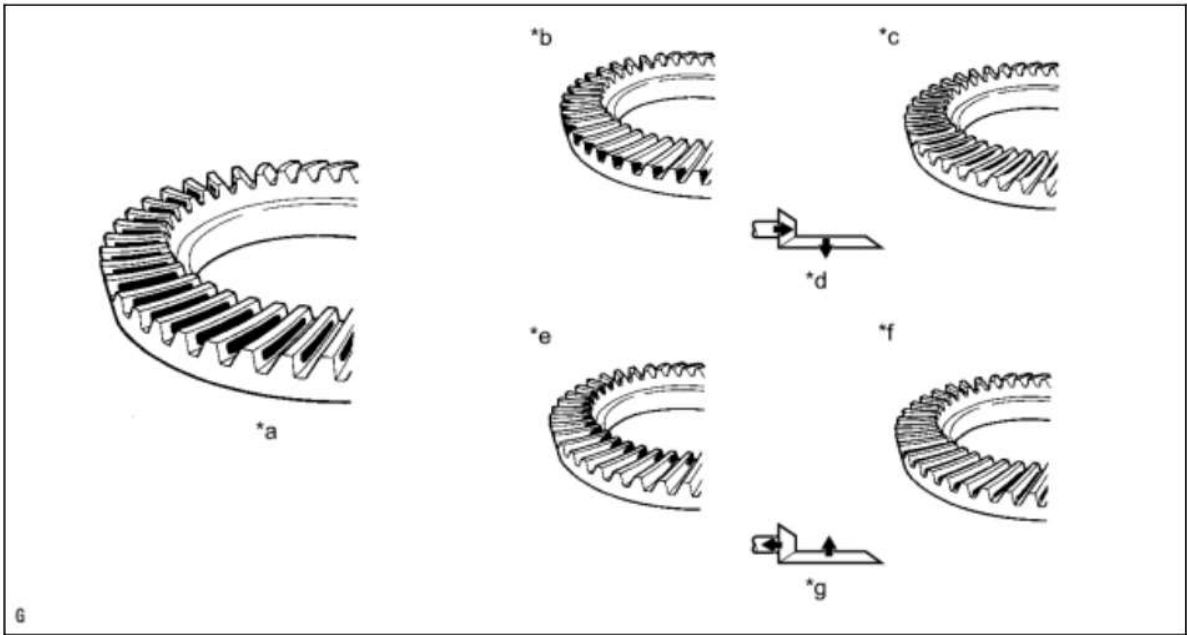
- Record the measured backlash to use as a reference for selecting a rear differential side gear shaft plate washer.
- Inspect the tooth contact and use the result as a reference for selecting a rear differential side gear shaft plate washer.

## **12. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION**



(a) Coat 3 or 4 teeth at 3 different positions on the differential ring gear with Prussian blue.

- (b) Rotate the differential ring gear in both directions.
- (c) Inspect the tooth contact pattern.



Text in Illustration

|    |                                                                                 |    |                                                                                 |
|----|---------------------------------------------------------------------------------|----|---------------------------------------------------------------------------------|
| *a | Proper Contact                                                                  | *b | Heel Contact                                                                    |
| *c | Face Contact                                                                    | *d | Select an adjusting washer that brings the drive pinion closer to the ring gear |
| *e | Toe Contact                                                                     | *f | Flank Contact                                                                   |
| *g | Select an adjusting washer that shifts the drive pinion away from the ring gear | -  | -                                                                               |

(d) If the teeth are not contacting properly, use the following table to select a proper rear differential drive pinion plate washer for correction.

Text in Illustration

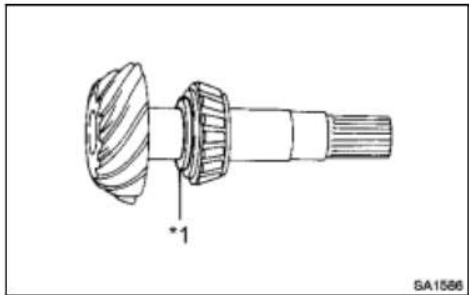
|    |                                             |
|----|---------------------------------------------|
| *1 | Rear Differential Drive Pinion Plate Washer |
|----|---------------------------------------------|

NOTICE:

- If the contact pattern is face contact or flank contact, tooth contact may be adjustable while keeping the backlash within the specified range.
- If the thickness of the rear differential drive pinion plate washer has been changed, adjust the backlash and measure the total preload.

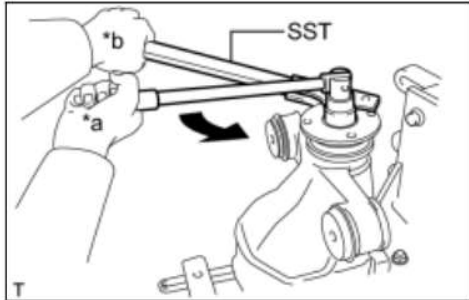
Standard Plate Washer:

| PART NO. | MARK | THICKNESS | PART NO. | MARK | THICKNESS |
|----------|------|-----------|----------|------|-----------|
|          |      |           |          |      |           |



|             |   |                         |             |    |                         |
|-------------|---|-------------------------|-------------|----|-------------------------|
| 90201-35497 | - | 1.70 mm<br>(0.0669 in.) | 90201-35508 | -  | 2.03 mm<br>(0.0799 in.) |
| 90201-35498 | - | 1.73 mm<br>(0.0681 in.) | 90201-35509 | -  | 2.06 mm<br>(0.0811 in.) |
| 90201-35499 | - | 1.76 mm<br>(0.0693 in.) | 90201-35510 | -  | 2.09 mm<br>(0.0823 in.) |
| 90201-35500 | - | 1.79 mm<br>(0.0705 in.) | 90201-35511 | -  | 2.12 mm<br>(0.0795 in.) |
| 90201-35501 | - | 1.82 mm<br>(0.0717 in.) | 90201-35512 | -  | 2.15 mm<br>(0.0846 in.) |
| 90201-35502 | - | 1.85 mm<br>(0.0728 in.) | 90201-35513 | -  | 2.18 mm<br>(0.0858 in.) |
| 90201-35503 | - | 1.88 mm<br>(0.0740 in.) | 90201-35514 | -  | 2.21 mm<br>(0.0870 in.) |
| 90201-35504 | - | 1.91 mm<br>(0.0752 in.) | 90201-35515 | 01 | 2.24 mm<br>(0.0882 in.) |
| 90201-35505 | - | 1.94 mm<br>(0.0764 in.) | 90201-35516 | 02 | 2.27 mm<br>(0.0894 in.) |
| 90201-35506 | - | 1.97 mm<br>(0.0776 in.) | 90201-35517 | 03 | 2.30 mm<br>(0.0906 in.) |
| 90201-35507 | - | 2.00 mm<br>(0.0787 in.) | 90201-35518 | 04 | 2.33 mm<br>(0.0917 in.) |

13. REMOVE REAR DRIVE PINION NUT

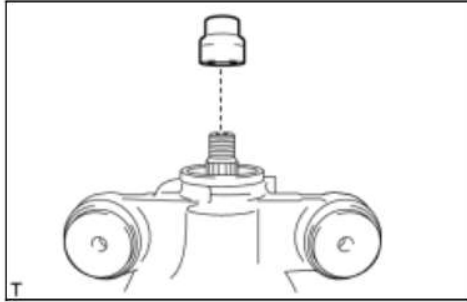


(a) Using SST to hold the rear drive pinion companion flange, remove the differential carrier assembly rear.

Text in Illustration

|    |      |
|----|------|
| *a | Turn |
| *b | Hold |

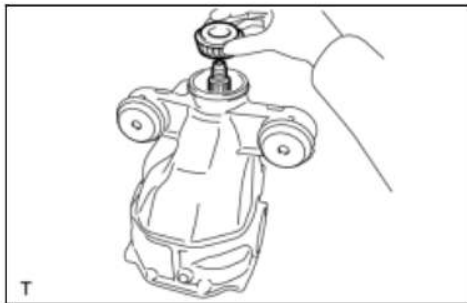
SST: 09330-00021

**14. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY** INFO**15. REMOVE REAR DIFFERENTIAL DRIVE PINION OIL SLINGER** INFO**16. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING** INFO**17. INSTALL REAR DIFFERENTIAL DRIVE PINION BEARING SPACER**

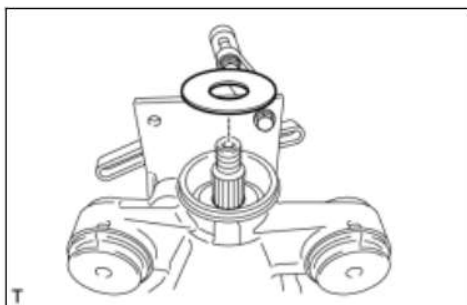
- (a) Install a new rear differential drive pinion bearing spacer to the differential drive pinion.

**NOTICE:**

Be sure to install the spacer so that the side with the larger inner diameter faces the rear differential carrier as shown in the illustration.

**18. INSTALL REAR DRIVE PINION FRONT TAPERED ROLLER BEARING**

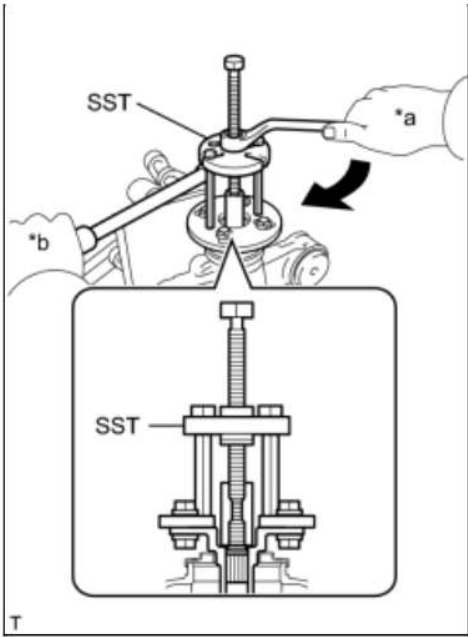
- (a) Install the rear drive pinion front tapered roller bearing (inner race) to the differential drive pinion.

**19. INSTALL REAR DIFFERENTIAL DRIVE PINION OIL SLINGER**

- (a) Install the rear differential drive pinion oil slinger to the differential drive pinion.

**20. INSTALL REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY**

- (a) Using SST, install the rear drive pinion companion flange.



Text in Illustration

|    |      |
|----|------|
| *a | Turn |
| *b | Hold |

SST: 09950-30012

- 09951-03010
- 09953-03010
- 09954-03010
- 09955-03030
- 09956-03030

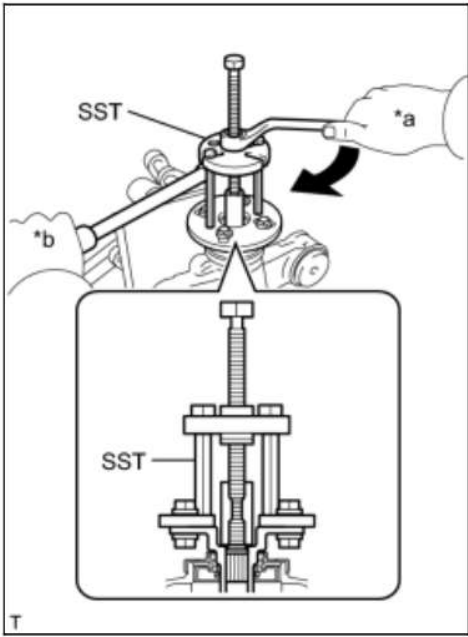
NOTICE:

Apply grease to the threads of SST center bolt before use.

21. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY INFO

22. INSTALL REAR DIFFERENTIAL CARRIER OIL SEAL INFO

23. INSTALL REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY



(a) Using SST, install the rear drive pinion companion flange.

Text in Illustration

|    |      |
|----|------|
| *a | Turn |
| *b | Hold |

SST: 09950-30012

- 09951-03010
- 09953-03010
- 09954-03010
- 09955-03030
- 09956-03030

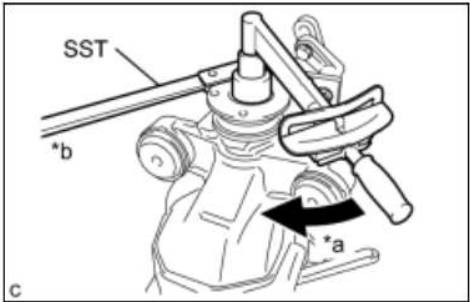
NOTICE:

Apply grease to the threads of SST center bolt before use.

(b) Coat the threads of the rear drive pinion nut with hypoid gear oil LSD.

(c) Using SST and a torque wrench, hold the rear drive pinion companion flange and tighten the rear drive pinion nut.

Text in Illustration



|    |      |
|----|------|
| *a | Turn |
| *b | Hold |

SST: 09330-00021  
Torque: 338 N·m (3445 kgf·cm, 249ft·lbf) or less

- NOTICE:**
- Tighten the rear drive pinion nut to approximately 100 N·m (1020 kgf·cm, 74 ft.\*lbf), and then tighten it further while checking the differential drive pinion preload.
  - Apply hypoid gear oil LSD to the rear drive pinion nut and the threads of the differential drive pinion.

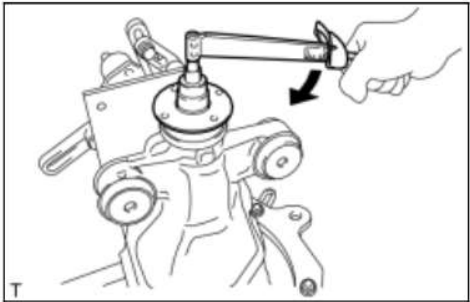
24. ADJUST DIFFERENTIAL DRIVE PINION PRELOAD

- (a) Using a torque wrench, measure the starting torque of the differential drive pinion.

- HINT:**
- The backlash between the differential drive pinion and differential ring gear should allow enough movement of the differential drive pinion to allow this measurement to be performed.
  - Make sure not to include the preload of the differential ring gear (rear differential case sub-assembly) in the measurement of the differential drive pinion preload.

Differential Drive Pinion Preload (at Starting):

| ITEM                                            | SPECIFIED CONDITION                                          |
|-------------------------------------------------|--------------------------------------------------------------|
| New rear drive pinion tapered roller bearing    | 1.49 to 2.59 N·m (15.2 to 26.4 kgf·cm, 13.2 to 22.9 in.*lbf) |
| Reused rear drive pinion tapered roller bearing | 1.11 to 1.91 N·m (11.3 to 19.5 kgf·cm, 9.8 to 16.9 in.*lbf)  |

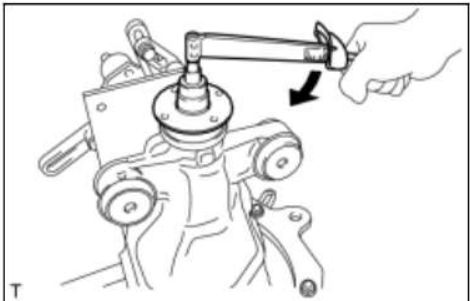


- If the preload is less than the specified minimum value, check the preload while retightening the rear drive pinion nut by 5 to 10° to adjust it so that it is within the specified range.  
Torque:  
338 N·m (3445 kgf·cm, 249 ft.\*lbf) or less
- If the preload is less than the specified minimum value even when the tightening torque of the rear drive pinion nut is more than the specified maximum value, loosen the rear drive pinion nut and check that the

- threads of the rear drive pinion nut and differential drive pinion are not stripped.
- If the threads are not stripped, replace the rear differential drive pinion bearing spacer. Apply hypoid gear oil LSD to the threads of the differential drive pinion and repeat the procedure.

25. INSPECT TOTAL PRELOAD

- (a) Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.
- Total Preload (at Starting):

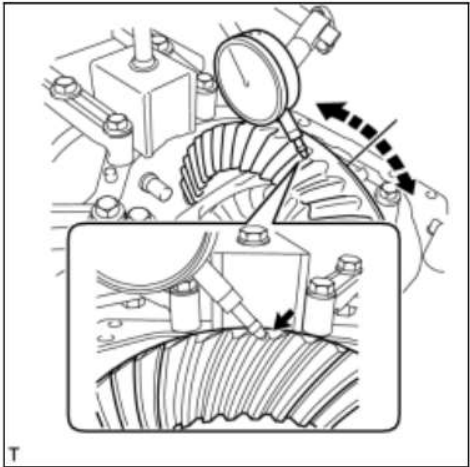


| ITEM                                            |                                  | SPECIFIED CONDITION                                          |
|-------------------------------------------------|----------------------------------|--------------------------------------------------------------|
| New rear drive pinion tapered roller bearing    | New differential case bearing    | 2.57 to 4.26 N*m (26.2 to 43.4 kgf*cm, 22.7 to 37.7 in.*lbf) |
|                                                 | Reused differential case bearing | 1.98 to 3.37 N*m (20.2 to 34.4 kgf*cm, 17.5 to 29.8 in.*lbf) |
| Reused rear drive pinion tapered roller bearing | New differential case bearing    | 2.19 to 3.58 N*m (22.3 to 36.5 kgf*cm, 19.4 to 31.7 in.*lbf) |
|                                                 | Reused differential case bearing | 1.60 to 2.69 N*m (16.3 to 27.4 kgf*cm, 14.2 to 23.8 in.*lbf) |

If the total preload is not within the specified range, adjust the total preload or perform repairs as necessary.

26. INSPECT DIFFERENTIAL RING GEAR BACKLASH

- (a) Set a dial indicator perpendicular to the end of the differential ring gear face.



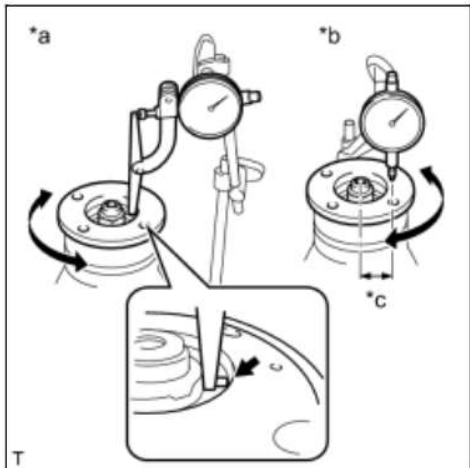
- (b) While holding the rear drive pinion companion flange, rotate the differential ring gear and measure the backlash.

Standard Backlash:  
0.13 to 0.18 mm (0.00512 to 0.00708 in.)

27. INSPECT RUNOUT OF REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY

(a) Using a dial indicator, measure the vertical and lateral runout of the rear drive pinion companion flange.

Text in Illustration



|    |                   |
|----|-------------------|
| *a | Vertical Runout   |
| *b | Lateral Runout    |
| *c | 30 mm (1.181 in.) |

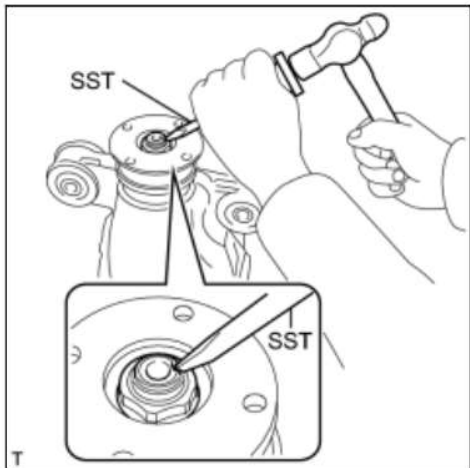
Maximum Runout:

| ITEM            | SPECIFIED CONDITION   |
|-----------------|-----------------------|
| Vertical runout | 0.09 mm (0.00354 in.) |
| Lateral runout  | 0.09 mm (0.00354 in.) |

**NOTICE:**  
Measure the runout of the rear drive pinion companion flange horizontally at a position 30 mm (1.181 in.) away from the center of the differential drive pinion shaft.

If the runout is more than the maximum, replace the rear drive pinion companion flange and differential ring gear.

28. STAKE REAR DRIVE PINION NUT



(a) Using SST and a hammer, stake the rear drive pinion nut.

SST: 09930-00010

29. INSTALL REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL

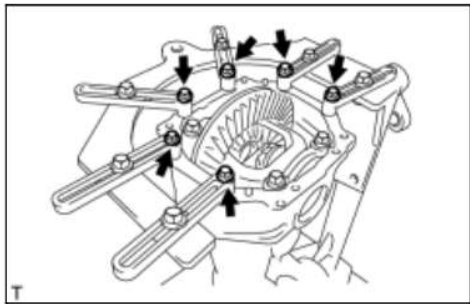
INFO

30. INSTALL REAR DIFFERENTIAL DRAIN PLUG

(a) Using a hexagon wrench 10 mm, install the rear differential drain plug and a new gasket.

Torque: 49 N·m (500 kgf·cm, 36ft·lbf)

31. REMOVE REAR DIFFERENTIAL CARRIER SUB-ASSEMBLY

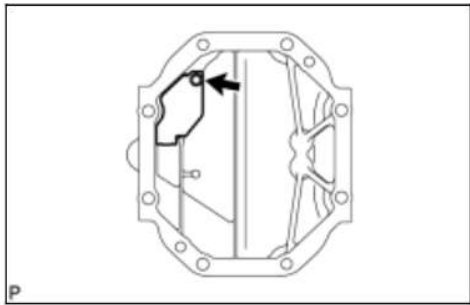


- (a) Remove the rear differential carrier sub-assembly from the overhaul stand.

32. INSTALL REAR DIFFERENTIAL BREATHER PLUG OIL DEFLECTOR

- (a) Clean the seal packing attached to the rear differential carrier and the rear differential carrier cover using a scraper and wire brush. Then remove the oil with non-residue solvent or equivalent.

**NOTICE:**  
Do not scratch the sealing surface.



- (b) Install the rear differential breather plug oil deflector to the rear differential carrier cover with the bolt.

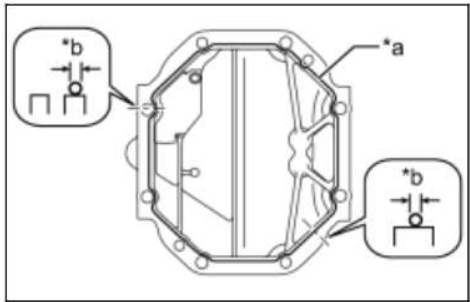
**Torque: 8.0 N·m (82 kgf·cm, 71in·lbf)**

33. INSTALL REAR DIFFERENTIAL CARRIER COVER

- (a) Apply seal packing to the rear differential carrier cover as shown in the illustration.

Text in Illustration

|    |                                 |
|----|---------------------------------|
| *a | Seal packing                    |
| *b | 2 to 3 mm (0.0787 to 0.118 in.) |

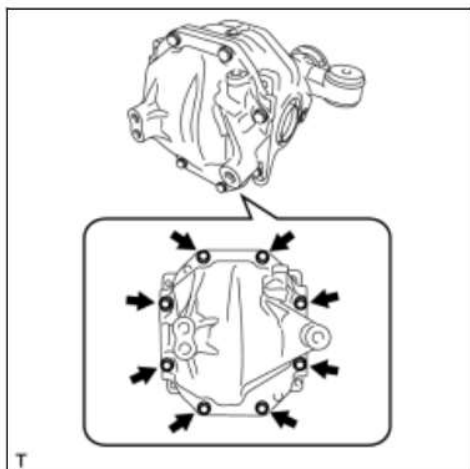


Seal packing:  
Toyota Genuine Seal Packing 1281, Three Bond 1281  
or equivalent

- NOTICE:**
- Apply the seal packing in a continuous line, approximately 2 to 3 mm (0.0787 to 0.118 in.) in diameter.
  - Overlap the seal packing at least 10 mm (0.394 in.) at

the beginning and end of application.

- Install the rear differential carrier cover within 3 minutes of application.



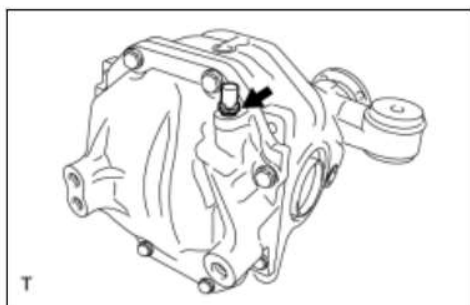
- (b) Install the rear differential carrier cover with the 8 bolts.

**Torque: 47 N·m (475 kgf·cm, 35ft·lbf)**

**NOTICE:**

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

### 34. INSTALL REAR DIFFERENTIAL BREATHER PLUG



- (a) Install the rear differential breather plug to the rear differential carrier cover.

**Torque: 21 N·m (210 kgf·cm, 16ft·lbf)**

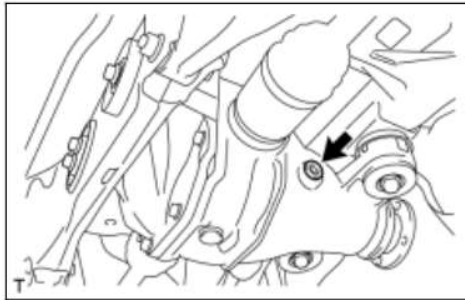


|                                                                                              |                    |                                |
|----------------------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                                              | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                                      | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000O5801NX |
| <b>Title:</b> AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER ASSEMBLY: REMOVAL (2013 FR-S) |                    |                                |

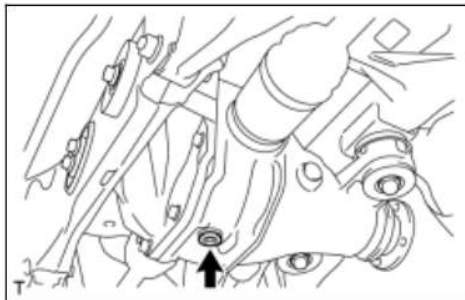
## REMOVAL

### 1. REMOVE REAR WHEEL

### 2. DRAIN DIFFERENTIAL OIL



- (a) Using a hexagon wrench 10 mm, remove the rear differential filler plug and gasket.



- (b) Using a hexagon wrench 10 mm, remove the rear differential drain plug and gasket to drain the differential oil.

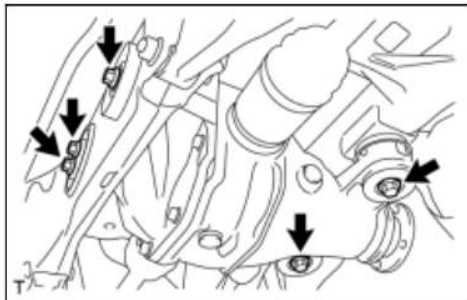
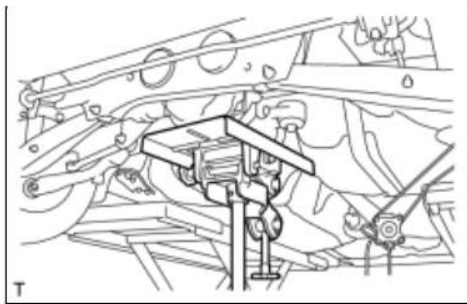
### 3. REMOVE CENTER EXHAUST PIPE ASSEMBLY INFO

### 4. REMOVE PROPELLER WITH CENTER BEARING SHAFT ASSEMBLY

INFO

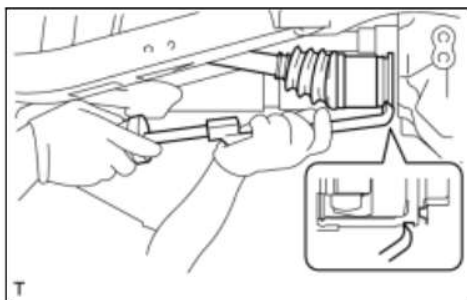
### 5. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

- (a) Support the rear differential carrier assembly with a transmission jack.



(b) Remove the 5 bolts, rear upper differential mount stopper and rear lower differential mount stopper.

(c) Lower the transmission jack slowly.



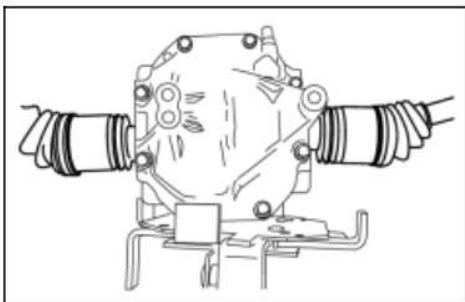
(d) Using a SST, disconnect the rear drive shaft assembly from the rear differential carrier assembly as shown in the illustration.

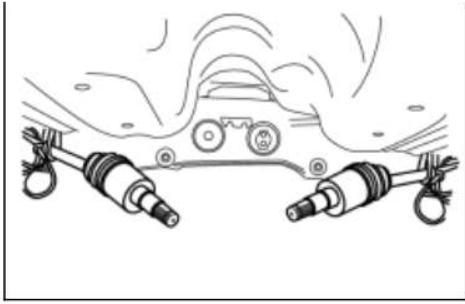
**SST: 09520-01010**

**SST: 09520-24010**

09520-32040

(e) Lower the transmission jack and pull off the rear drive shaft assembly from the rear differential carrier assembly, and then remove the rear differential carrier assembly.



**HINT:**

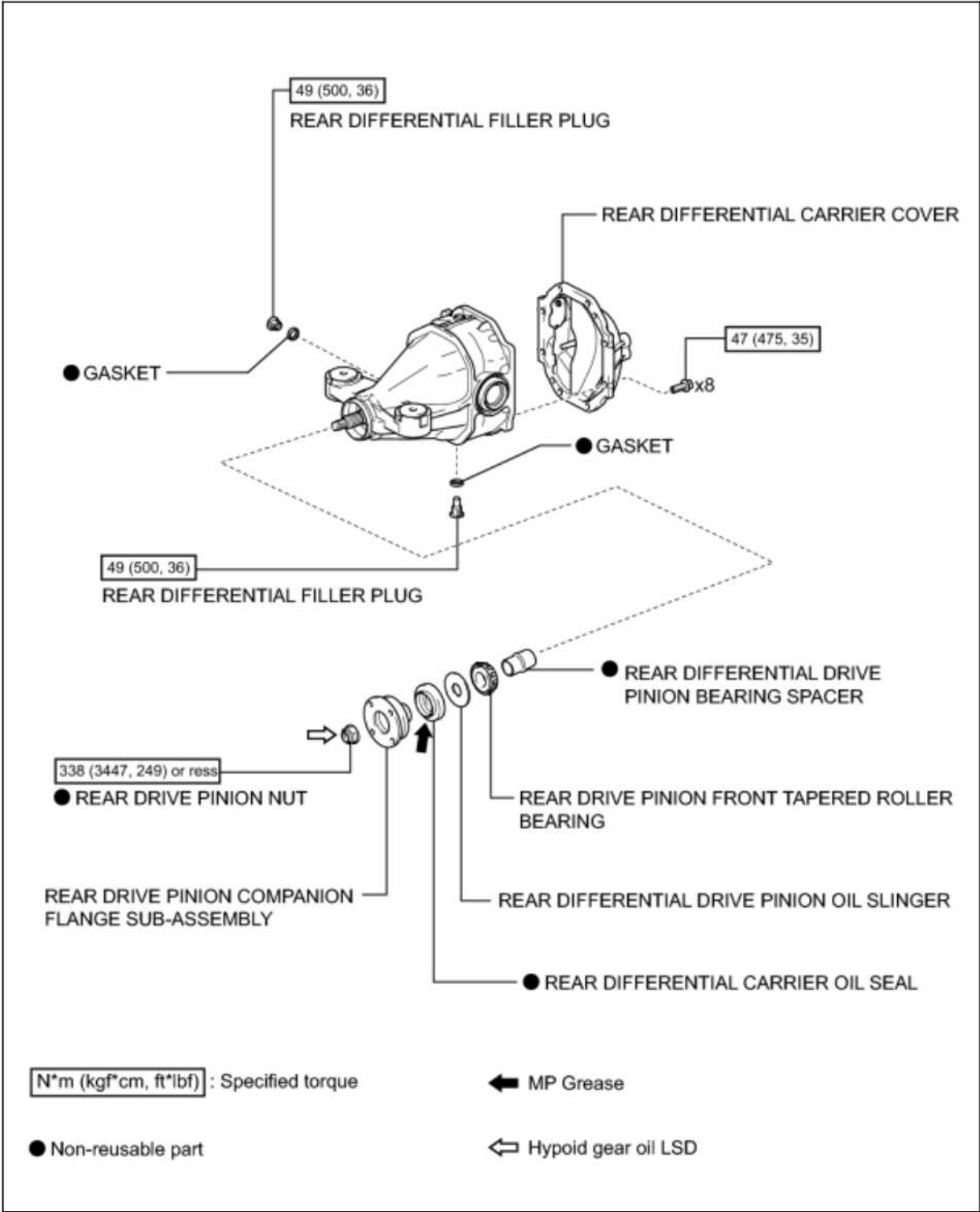
**Tie the disconnected rear drive shaft with a rope.**



|                                                                                          |             |                         |
|------------------------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                                 | 6.4 K       | From: 201203            |
| Model Year: 2013                                                                         | Model: FR-S | Doc ID: RM000003F7X00NX |
| Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER OIL SEAL: COMPONENTS (2013 FR-S) |             |                         |

COMPONENTS

ILLUSTRATION



|                                                                                           |             |                         |
|-------------------------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                                  | 6.4 A       | From: 201203            |
| Model Year: 2013                                                                          | Model: FR-S | Doc ID: RM0000009HY02YX |
| Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL CARRIER OIL SEAL: REPLACEMENT (2013 FR-S) |             |                         |

## REPLACEMENT

### 1. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

### 2. REMOVE REAR DIFFERENTIAL CARRIER COVER

INFO

### 3. SECURE REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

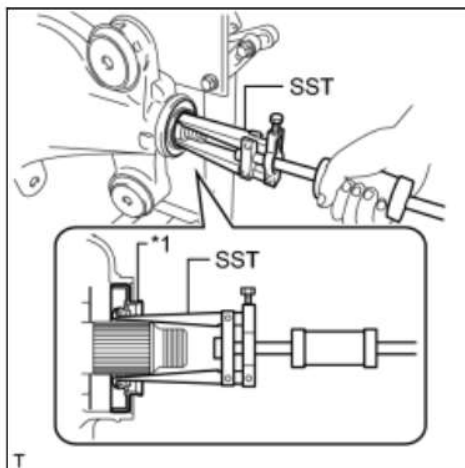
### 4. REMOVE REAR DRIVE PINION NUT

INFO

### 5. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY

INFO

### 6. REMOVE REAR DIFFERENTIAL CARRIER OIL SEAL



(a) Using SST, remove the rear differential carrier oil seal from the rear differential carrier.

**SST: 09308-00010**

|    |                                    |
|----|------------------------------------|
| *1 | Rear Differential Carrier Oil Seal |
|----|------------------------------------|

#### HINT:

When replace the rear differential carrier oil seal, replace the rear differential drive pinion bearing spacer and adjust the drive pinion preload.

### 7. REMOVE REAR DIFFERENTIAL DRIVE PINION OIL SLINGER

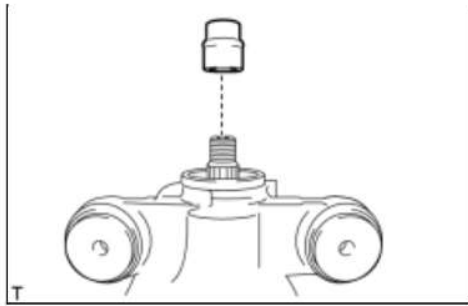
INFO

### 8. REMOVE REAR DRIVE PINION FRONT TAPERED ROLLER BEARING

INFO

### 9. REPLACE REAR DIFFERENTIAL DRIVE PINION BEARING SPACER

(a) Replace the new rear differential drive pinion bearing spacer.



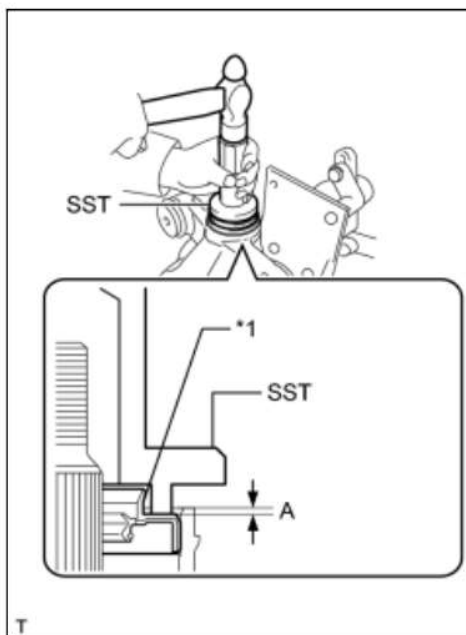
**10. INSTALL REAR DRIVE PINION FRONT TAPERED ROLLER BEARING** INFO

**11. INSTALL REAR DIFFERENTIAL DRIVE PINION OIL SLINGER** INFO

**12. INSTALL REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY** INFO

**13. REMOVE REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY** INFO

**14. INSTALL REAR DIFFERENTIAL CARRIER OIL SEAL**



(a) Using SST and a hammer, install the new rear differential carrier oil seal.

**SST: 09554-22010**

Standard depth:

1.55 to 2.45 mm (0.0610 to 0.0964 in.)

|    |                                    |
|----|------------------------------------|
| *1 | Rear Differential Carrier Oil Seal |
|----|------------------------------------|

**NOTICE:**

- Tap the oil seal uniformly so that the oil seal is straight.
- Do not excessively tap the oil seal.

(b) Apply MP grease to the rear differential carrier oil seal lip.

**15. INSTALL REAR DRIVE PINION COMPANION FLANGE SUB-ASSEMBLY** INFO

**16. ADJUST DIFFERENTIAL DRIVE PINION PRELOAD** INFO

**17. INSPECT TOTAL PRELOAD** INFO

**18. STAKE REAR DRIVE PINION NUT** INFO

**19. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY** INFO

**20. INSTALL REAR DIFFERENTIAL CARRIER COVER** INFO

**21. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY**

INFO

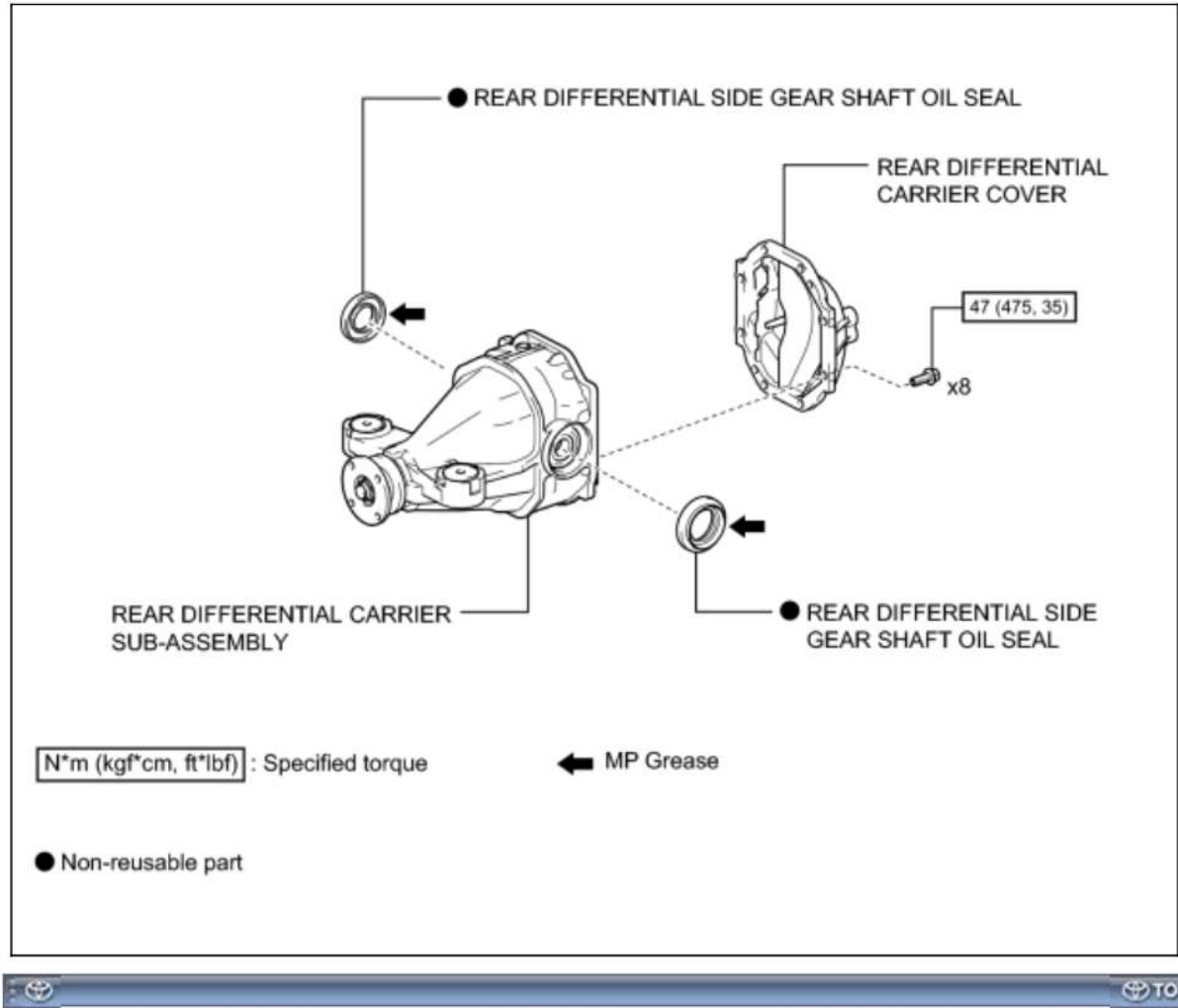


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|                                                                                                  |             |                         |
|--------------------------------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                                                         | 6.4 K       | From: 201203            |
| Model Year: 2013                                                                                 | Model: FR-S | Doc ID: RM000001RHY00TX |
| Title: AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL: COMPONENTS (2013 FR-S) |             |                         |

COMPONENTS

ILLUSTRATION



|                                                                                                          |                    |                                |
|----------------------------------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                                                          | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                                                  | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000001RHX01BX |
| <b>Title:</b> AXLE AND DIFFERENTIAL: REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL: REPLACEMENT (2013 FR-S) |                    |                                |

## REPLACEMENT

### HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

#### 1. DRAIN DIFFERENTIAL OIL INFO

#### 2. REMOVE REAR DRIVE SHAFT ASSEMBLY LH

INFO

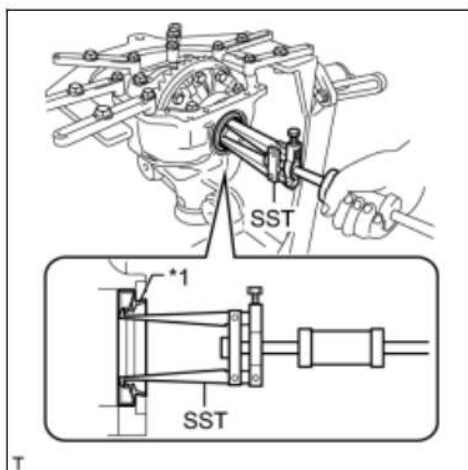
#### 3. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

INFO

#### 4. REMOVE REAR DIFFERENTIAL CARRIER COVER INFO

#### 5. SECURE REAR DIFFERENTIAL CARRIER SUB-ASSEMBLY INFO

#### 6. REMOVE REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL



- (a) Using SST, remove the rear differential side gear shaft oil seal.

**SST: 09308-00010**

**Text in Illustration**

|    |                                            |
|----|--------------------------------------------|
| *1 | Rear Differential Side Gear Shaft Oil Seal |
|----|--------------------------------------------|

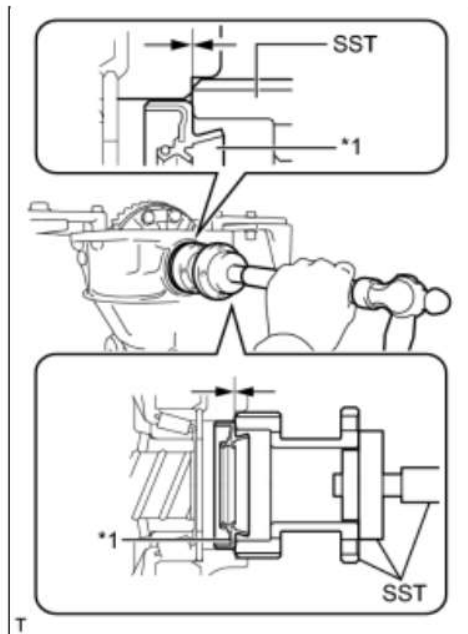
#### 7. INSTALL REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL

- (a) Using SST and a hammer, install a new 2 rear differential side gear shaft oil seals.

**SST: 09213-70011**

**SST: 09950-60010**

**SST: 09950-70010**



09951-00410

09951-00620

09951-07100

09952-06010

**Text in Illustration**

|    |                                            |
|----|--------------------------------------------|
| *1 | Rear Differential Side Gear Shaft Oil Seal |
|----|--------------------------------------------|

Oil seal depth:

-0.5 to 0.5 mm (-0.0197 to 0.0197 in.)

**NOTICE:**

- To ensure a proper seal, evenly tap in the rear differential side gear shaft oil seal.
- When installing the oil seal, tap it in until its surface is flush with the rear differential carrier.

**8. INSTALL REAR DIFFERENTIAL CARRIER SUB-ASSEMBLY**

INFO

**9. INSTALL REAR DIFFERENTIAL CARRIER COVER**

INFO

**10. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY**

INFO

**11. INSTALL REAR DRIVE SHAFT ASSEMBLY**

INFO

**12. ADD DIFFERENTIAL OIL**

INFO

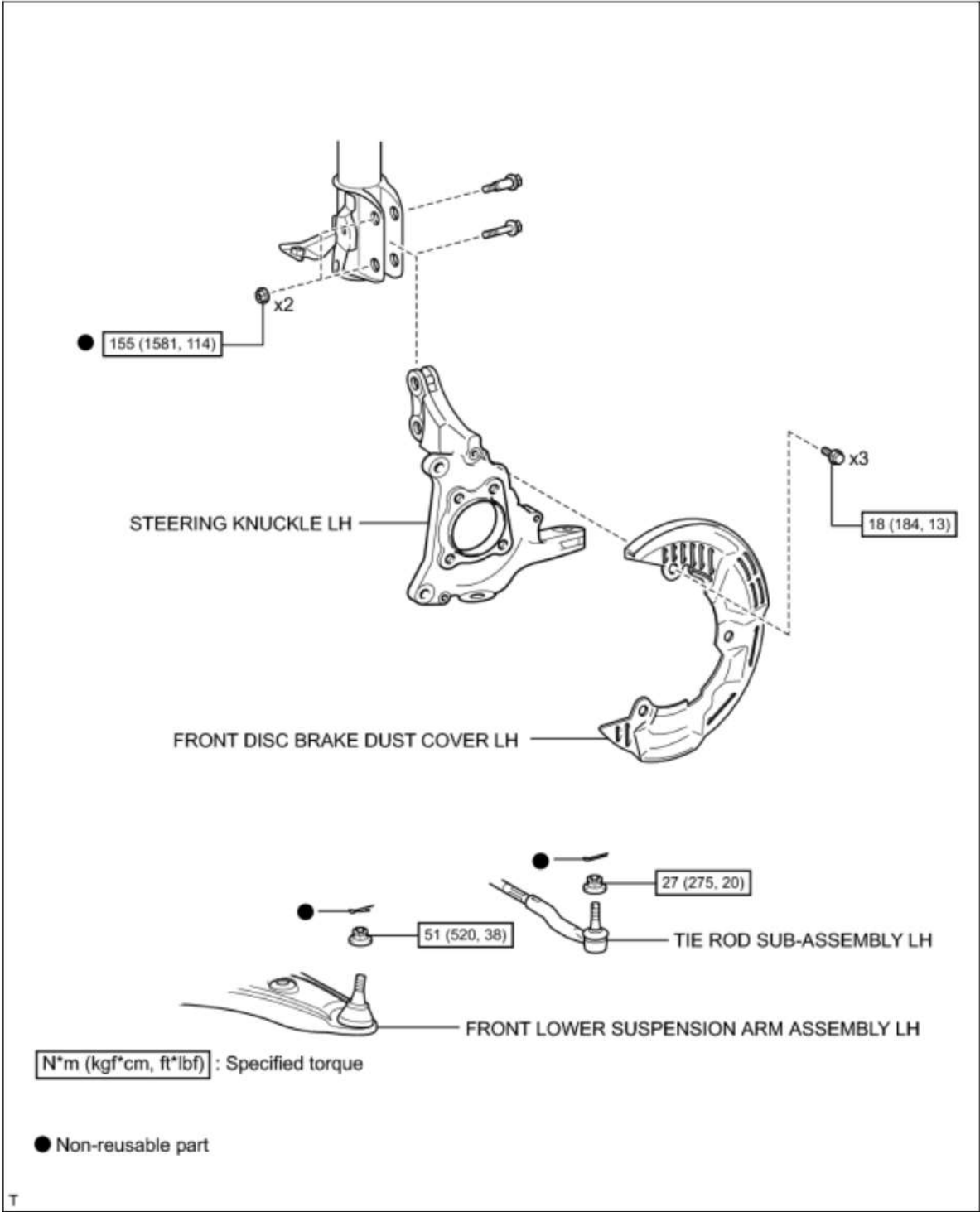


TOYOTA

|                                                                        |             |                         |
|------------------------------------------------------------------------|-------------|-------------------------|
| Last Modified: 3-27-2012                                               | 6.4 K       | From: 201203            |
| Model Year: 2013                                                       | Model: FR-S | Doc ID: RM000000O4G01SX |
| Title: AXLE AND DIFFERENTIAL: STEERING KNUCKLE: COMPONENTS (2013 FR-S) |             |                         |

COMPONENTS

ILLUSTRATION



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|                                                                                 |                    |                                |
|---------------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                                 | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                         | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000O4F02HX |
| <b>Title:</b> AXLE AND DIFFERENTIAL: STEERING KNUCKLE: INSTALLATION (2013 FR-S) |                    |                                |

## INSTALLATION

### HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

#### 1. INSTALL STEERING KNUCKLE LH

- (a) Install the steering knuckle LH with the 2 bolts and 2 new nuts.

**Torque: 155 N·m (1581 kgf·cm, 114ft·lbf)**

#### 2. INSTALL FRONT LOWER SUSPENSION ARM ASSEMBLY LH

- (a) Install the nut and the front lower suspension arm assembly LH.

**Torque: 51 N·m (520 kgf·cm, 38ft·lbf)**

- (b) Install new cotter pin.

#### 3. INSTALL TIE ROD SUB-ASSEMBLY LH

- (a) Install the nut and the tie rod sub-assembly LH to the steering knuckle LH.

**Torque: 27 N·m (275 kgf·cm, 20ft·lbf)**

- (b) Install new cotter pin.

### NOTICE:

**If the holes for the clip are not aligned, tighten the nut up to an additional 60°**

#### 4. INSTALL FRONT DISC BRAKE DUST COVER LH

- (a) Install the 3 bolts and the front disc brake dust cover LH to the steering knuckle LH.

**Torque: 18 N·m (184 kgf·cm, 13ft·lbf)**

#### 5. INSTALL FRONT WHEEL

**Torque: 120 N·m (1224 kgf·cm, 89ft·lbf)**

#### 6. INSTALL FRONT AXLE HUB SUB-ASSEMBLY

INFO

#### 7. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT

INFO

#### 8. VSC SENSOR NEUTRAL MEMORIZATION

INFO



|                                                                            |                    |                                |
|----------------------------------------------------------------------------|--------------------|--------------------------------|
| <b>Last Modified:</b> 3-27-2012                                            | 6.4 A              | <b>From:</b> 201203            |
| <b>Model Year:</b> 2013                                                    | <b>Model:</b> FR-S | <b>Doc ID:</b> RM000000O4H024X |
| <b>Title:</b> AXLE AND DIFFERENTIAL: STEERING KNUCKLE: REMOVAL (2013 FR-S) |                    |                                |

## REMOVAL

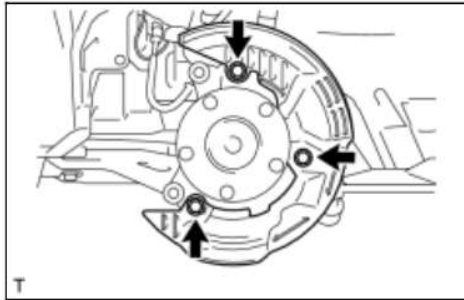
### HINT:

- Use the same procedure for the RH and LH sides.
- The procedure listed below is for the LH side.

### 1. REMOVE FRONT AXLE HUB SUB-ASSEMBLY LH

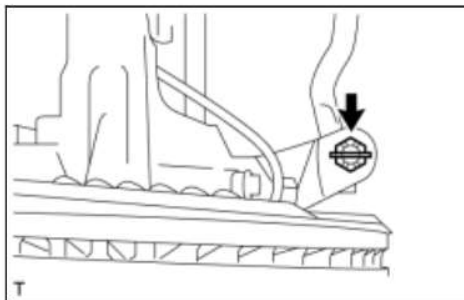
INFO

### 2. REMOVE FRONT DISC BRAKE DUST COVER LH



- (a) Remove the 3 bolts and the front disc brake dust cover LH.

### 3. DISCONNECT TIE ROD SUB-ASSEMBLY LH



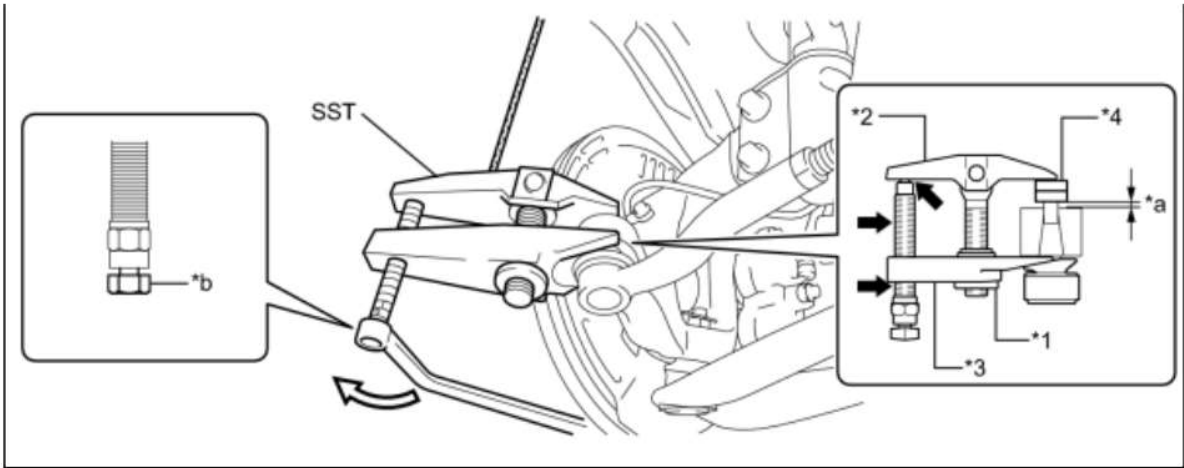
- (a) Remove the cotter pin and nut.

- (b) Install the SST (spacer B) to tie rod assembly.

### NOTICE:

As SST may become damaged, make sure the space between the tie rod and spacers is not less than 1 mm (0.0394 in.).

- (c) Using SST, disconnect the tie rod assembly.



**SST: 09960-20010**

09961-02010

09961-02060

**Text in Illustration**

|                                                                                     |                   |                                                                                      |                     |
|-------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------|---------------------|
| *1                                                                                  | Nut               | *2                                                                                   | Body                |
| *3                                                                                  | Claw              | *4                                                                                   | SST (spacer B)      |
| *a                                                                                  | 1 mm (0.0394 in.) | *b                                                                                   | Place a wrench here |
|  | Molybdenum grease |  | Turn                |

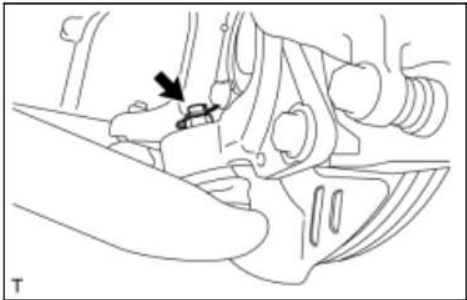
**CAUTION:**

Apply the molybdenum grease to the end and threads of SST bolt.

**NOTICE:**

- Install SST so that claw and body are parallel.
- Make sure to tie the string of SST to the vehicle to prevent SST from dropping.
- Do not damage the dust cover on the tie rod end sub-assembly.
- Do not damage the tie-rod end.
- Do not damage the ball joint dust cover.
- Do not damage the steering knuckle.

**4. REMOVE FRONT LOWER SUSPENSION ARM ASSEMBLY LH**



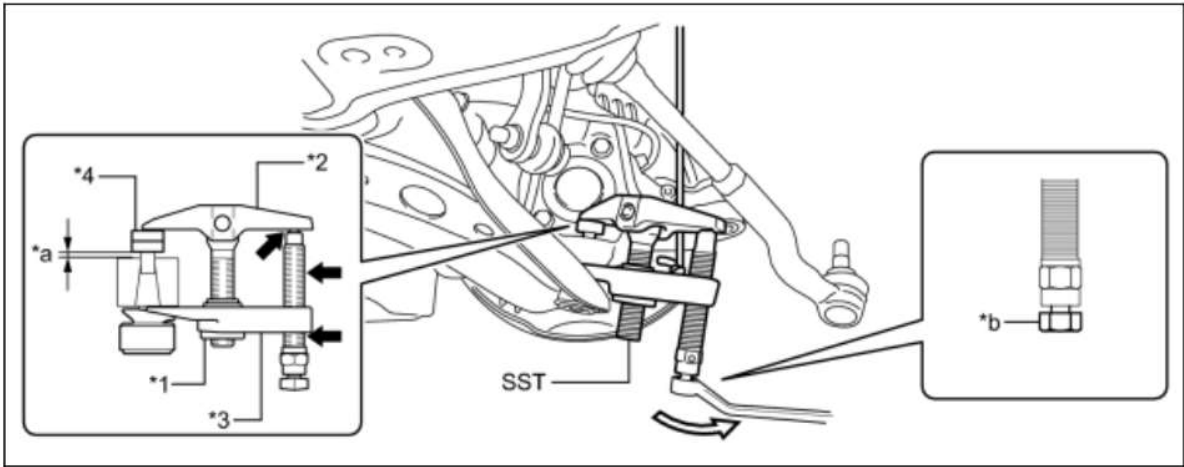
(a) Remove the cotter pin and nut.

(b) Install the SST (spacer B) to the front lower suspension arm assembly LH.

**NOTICE:**

As SST may become damaged, make sure the space between the front lower suspension arm assembly LH and spacers is not less than 1 mm (0.0394 in.).

(c) Using SST, disconnect the front lower suspension arm assembly LH.



**SST: 09960-20010**

09961-02010

09961-02060

**Text in Illustration**

|                                                                                     |                   |                                                                                      |                     |
|-------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------|---------------------|
| *1                                                                                  | Nut               | *2                                                                                   | Body                |
| *3                                                                                  | Claw              | *4                                                                                   | SST (spacer B)      |
| *a                                                                                  | 1 mm (0.0394 in.) | *b                                                                                   | Place a wrench here |
|  | Molybdenum grease |  | Turn                |

**CAUTION:**

Apply the molybdenum grease to the end and threads of SST bolt.

**NOTICE:**

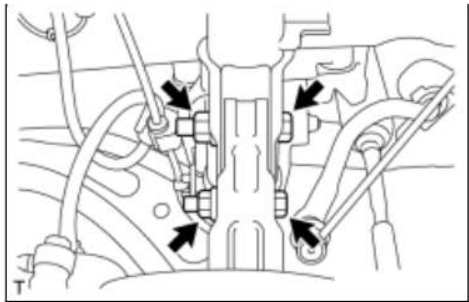
- Install SST so that claw and body are parallel.
- Make sure to tie the string of SST to the vehicle to prevent SST from dropping.
- Do not damage the dust cover on the front suspension lower arm assembly.
- Do not damage the front lower arm sub-assembly.
- Do not damage the front disc brake dust cover.
- Do not damage the steering knuckle.

**5. REMOVE STEERING KNUCKLE LH**

(a) Remove the steering knuckle LH with the 2 bolts and 2 nuts.

**NOTICE:**

When removing the nuts, keep the bolts from rotating.



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