

Service Manual



02

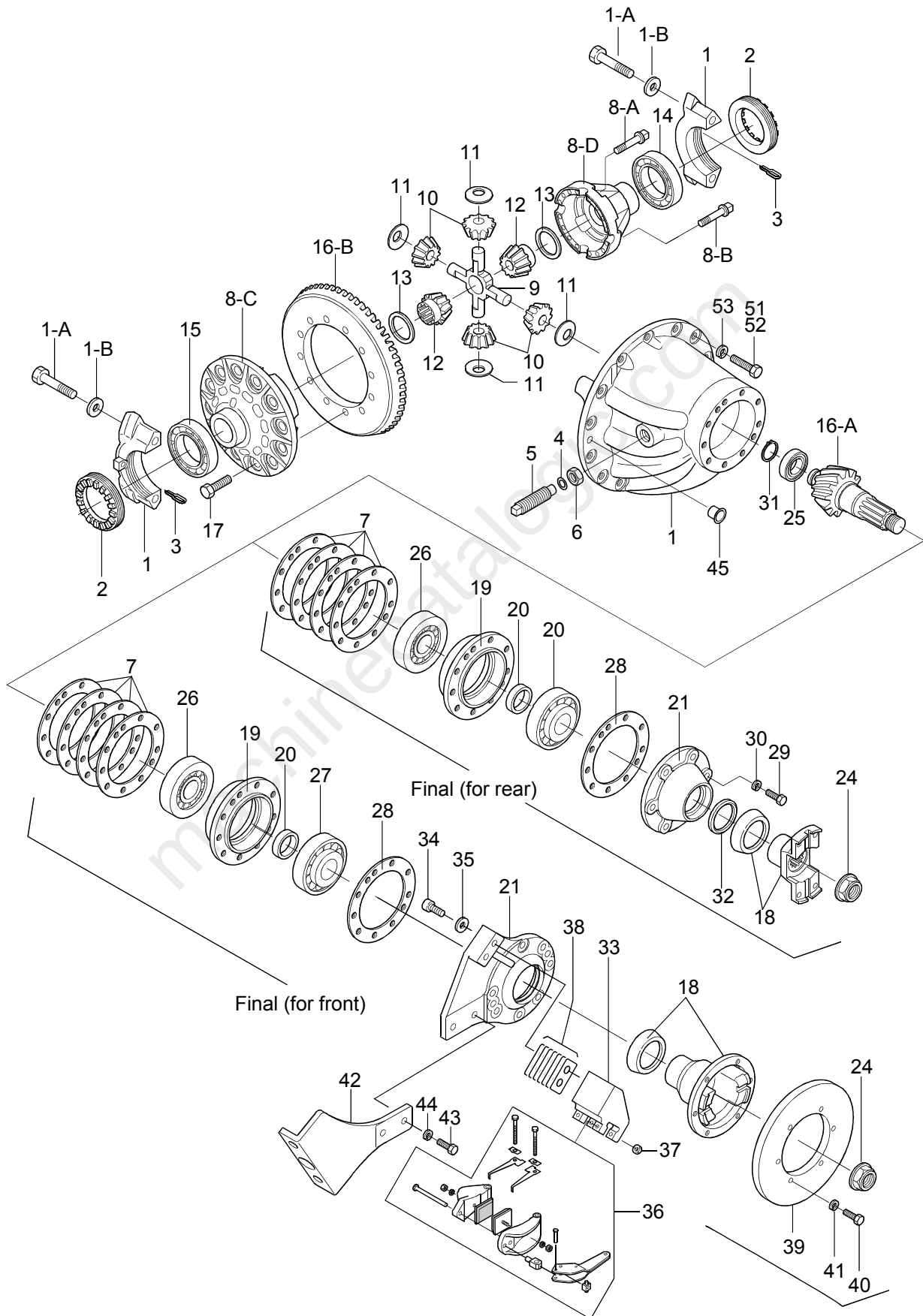
Driving Axle

	SHP-S24.0
Model	SHP-S24.0N

Structure

1.3 Exploded view

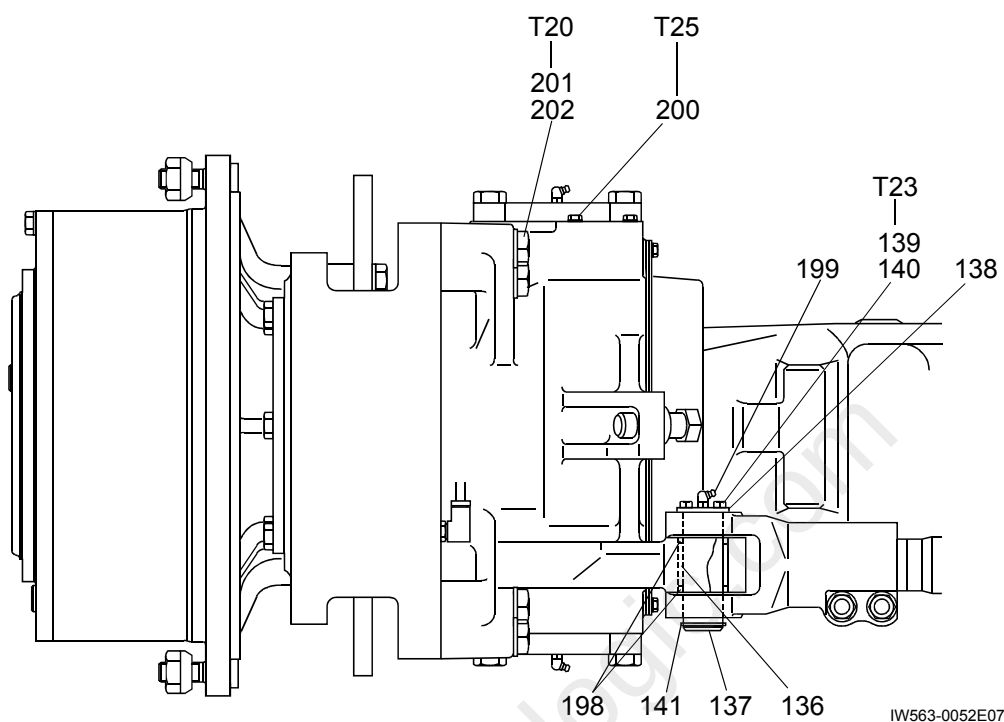
Front • rear



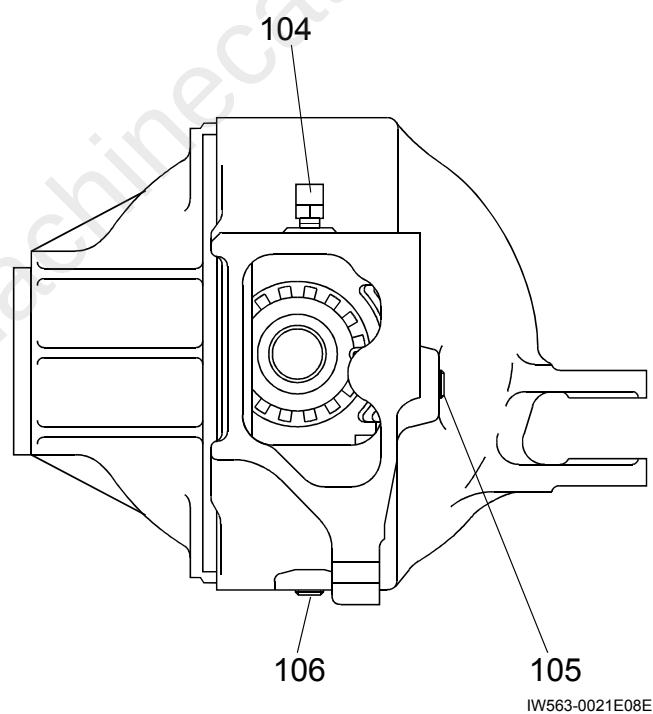
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Structure

1.7 Housing, speed reducer and brake (Rear)



1.8 Oil plug



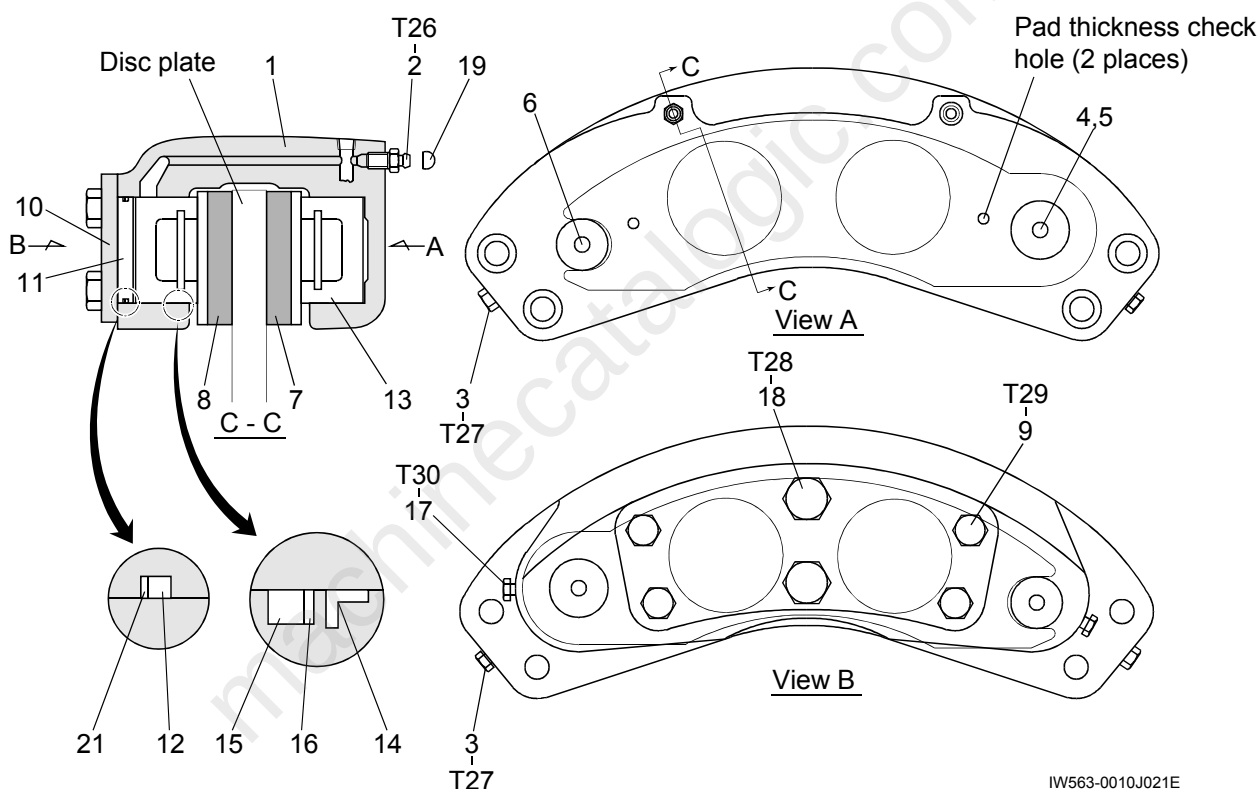
Structure

2.5 Disc brake

1. This is an opposed piston type Disc brake. This brake has two pad assy on both sides of the disc plate, and they pinch the disc plate when braking is applied.
2. When brake pressure is applied, the pistons built in the torque plates push the pad assy at their tips against the disc plate from both sides to create braking force.
3. The piston seal keeps a constant clearance between the pad assy and the disc plate.

Tightening torque

Place	Tightening torque		
	N • m	ft • lbf	kgf • m
T-26	23 - 28	17 - 21	2.3 - 2.9
T-27	52 ± 3	38.4 ± 2.2	5.3 ± 0.3
T-28	306 ± 15	226 ± 11	31.2 ± 1.5
T-29	207 ± 10	153 ± 7.4	21.1 ± 1.0
T-30	52 ± 3	38.4 ± 2.2	5.3 ± 0.3



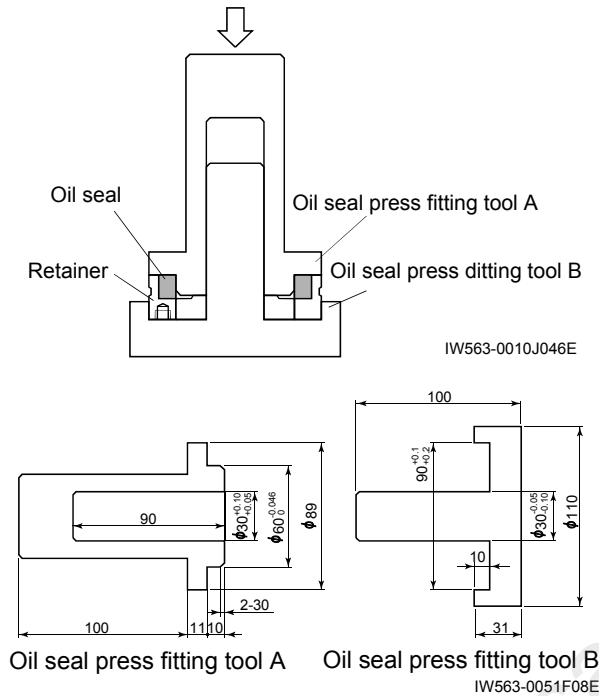
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- | | | | |
|-----------------------|----------------------|------------------|------------------|
| 1. Torque plate | 6. Torque pin (thin) | 11. Piston plug | 16. Back up ring |
| 2. Bleeder valve | 7. Pad assy | 12. Cap seal | 17. Bolt |
| 3. Bolt | 8. Pad assy | 13. Pistpn | 18. Cap bolt |
| 4. Torque pin (thick) | 9. Cap bolt | 14. Scraper ring | 19. Cap |
| 5. O-ring | 10. Cover plate | 15. Piston seal | 21. Back up ring |

Axle Assembly

[NOTICE]

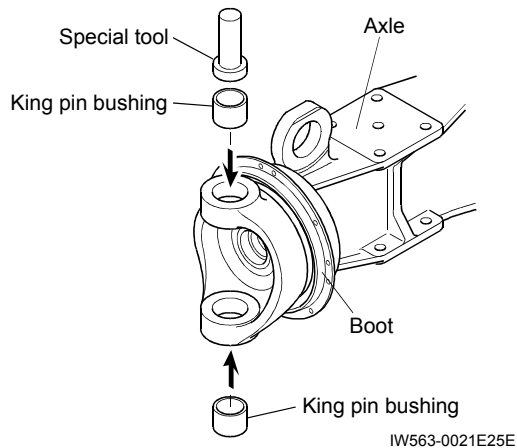
- ◆ The unit of marked figures is millimeter. Then if the measurement is conducted in "inch", dimensions have to be converted into "mm" by $1\text{mm} = 0.03937\text{in.}$



Press fit king pin bushings into upper and lower holes on axle housing. Then apply lithium base grease containing MoS2 to the inside surface of bushings.

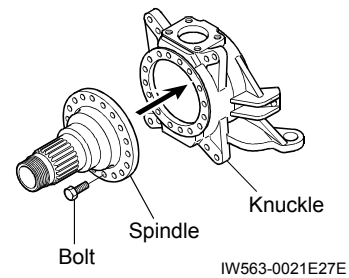
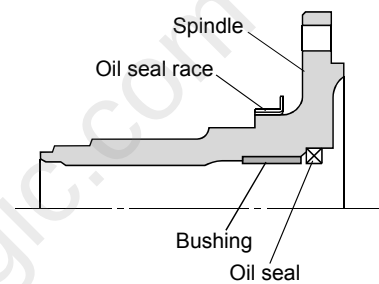
[NOTICE]

- ◆ Press fit king pin bushing so that the oil grooves face front and rear of the vehicle.
- ◆ Turn the step on the outer diameter of bushing to the shaft side, and press fit bushing until it hits plate.



4.3 Knuckle assy

1. Press fit bushing into knuckle. After press fitting, apply grease to bushing bores.
2. Press fit oil seal race onto knuckle spindle.
3. Press fit bushing.
4. Apply liquid gasket to the outside surface of oil seal, and press fit it into knuckle spindle. After press fitting, apply grease to the lip of oil seal.



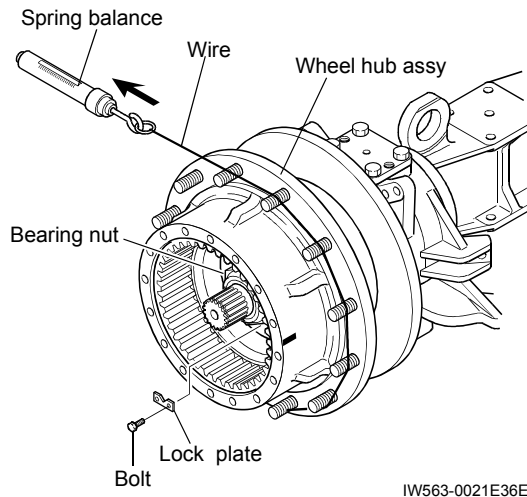
[NOTICE]

- ◆ Apply THREEBOND No. 1360K or equivalent to bolt threads.
- ◆ After insertion into knuckle spindle, wind a tape around the tip of the ball joint assy to protect oil seal from damages.

5. Install knuckle spindle to knuckle with bolts.

Tightening torque: $539 \pm 49 \text{ N} \cdot \text{m}$
 $\{398 \pm 36 \text{ ft} \cdot \text{lbf}\}$

Axle Assembly

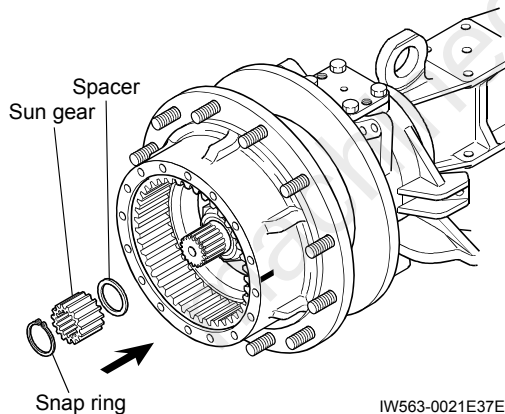


[NOTICE]

- ◆ Apply THREEBOND No. 1360K or equivalent to bolt threads.
- ◆ Be sure to place lock plate close to bearing nut for better locking performance.

3. Install lock plate next to bearing nut with bolts.

Tightening torque: $49 \pm 10 \text{ N}\cdot\text{m}$
 $\{ 36 \pm 7 \text{ ft}\cdot\text{lbf} \}$

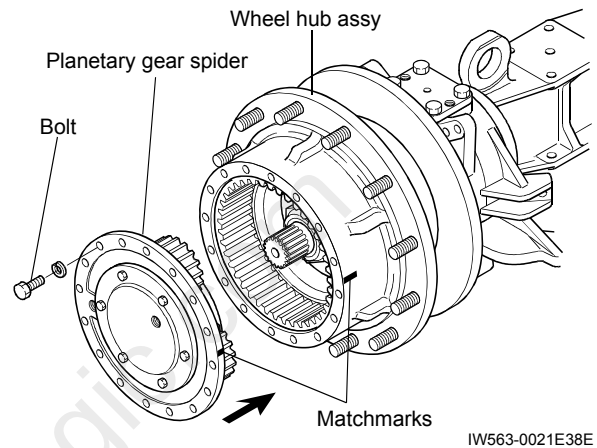


4. Install spacer and sun gear to shaft of ball joint assy, and fix them with snap ring.

4.12 Planetary gear spider assy

1. Put O-ring coated with grease in planetary gear spider assy. After aligning the matchmarks, install planetary gear spider assy to wheel hub with bolts.

Tightening torque: $127 \pm 20 \text{ N}\cdot\text{m}$ { $94 \pm 15 \text{ ft}\cdot\text{lbf}$ }



4.13 Tie rod assy

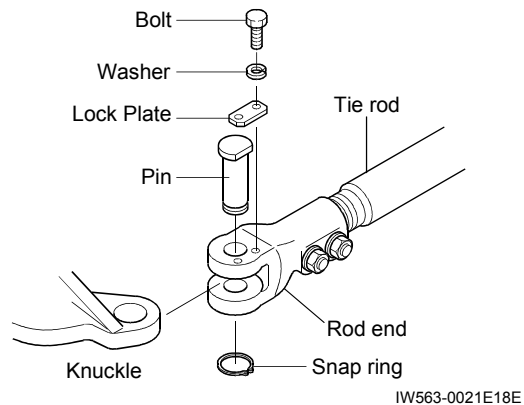
[NOTICE]

- ◆ Before driving tie rod end pin, make sure that the holes of tie rod end and knuckle align correctly with each other. This is necessary to avoid damage to the bushing.

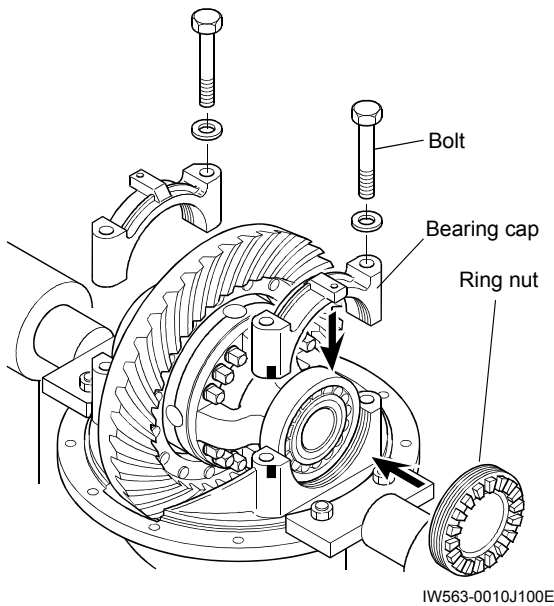
1. Fit tie rod assy over knuckle, drive tie rod end pin, and install lock plate with bolts.

Tightening torque: $24.5 \pm 5 \text{ N}\cdot\text{m}$ { $18.1 \pm 3.7 \text{ ft}\cdot\text{lbf}$ }

2. Put snap ring.



Differential Assembly



[NOTICE]

- ◆ Measure the force needed to turn cage while it is turning (not the force when it starts to turn). This measured force means the preload applied to the bearings.

2. Preload adjustment

Apply prescribed preloads by gradually tightening right and left ring nuts equally. Wind a wire around differential case body (where spider is) and measure preload with a spring balance.

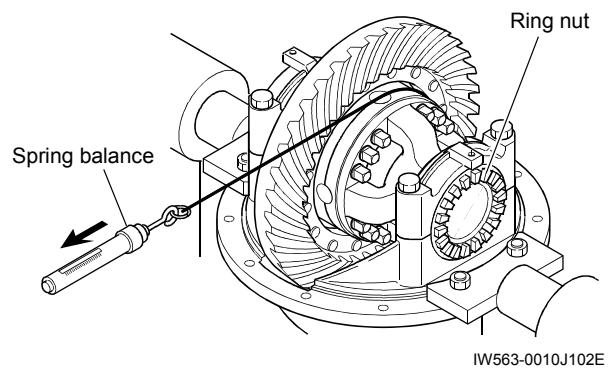
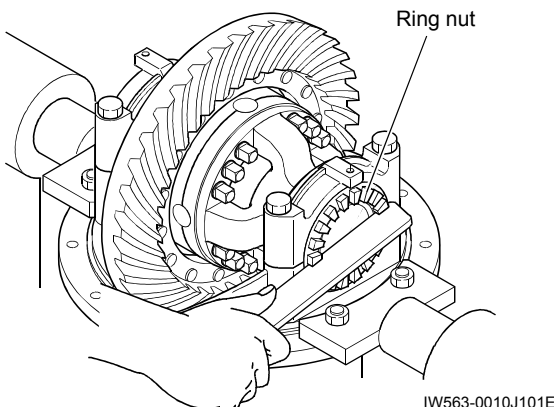
Standard value

Bearing (brand new): 26 - 37 N (5.84 - 8.32 lbf)

Bearing (reused): 14 - 20 N { 3.15 - 4.50 lbf }

[NOTICE]

- ◆ At adjustment, align ring nut groove with pin hole of bearing cap.
- ◆ When installing drive pinion, adjust differential case assy to the back side of spiral gear.

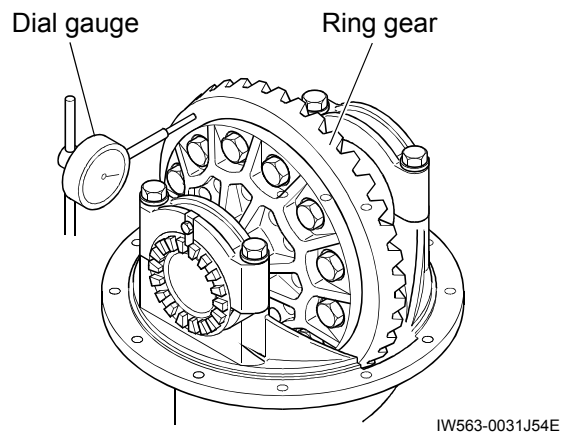


4. Measuring ring gear runout

[NOTICE]

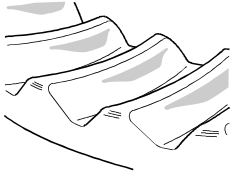
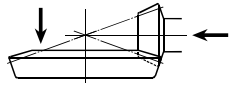
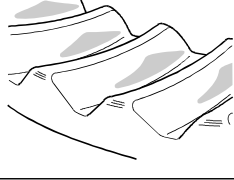
- ◆ If the runout is larger than the standard value, possible causes may be: incorrect tightening of adjusting nuts and bolts; dust particles between assembled parts. In such a case, repeat disassembling and reassembling.
- ◆ If the runout is still larger than the use limit even after repeated reassembling, replace the related parts.

Set a dial gauge to make it perpendicular to the back of ring gear as shown below. Then measure the runout while turning it.
Standard value: 1mm (0.004in) or less
Use limit: 0.2mm (0.008in)



- Put matchmarks right and left portions where ring nut groove aligns with pin hole of bearing cap.
- Remove differential case assy from carrier case

Differential Assembly

	Tooth contact pattern	Adjustment method
1	Good contact pattern 	No adjustment required
2	Wrong contact pattern (High bearing) 	Use thinner shims to move drive pinion close to ring gear, and adjust backlash with adjusting nuts. 
3	Wrong contact pattern (Low bearing) 	Use thicker shims to move drive pinion away from ring gear, and adjust backlash with adjusting nuts. 

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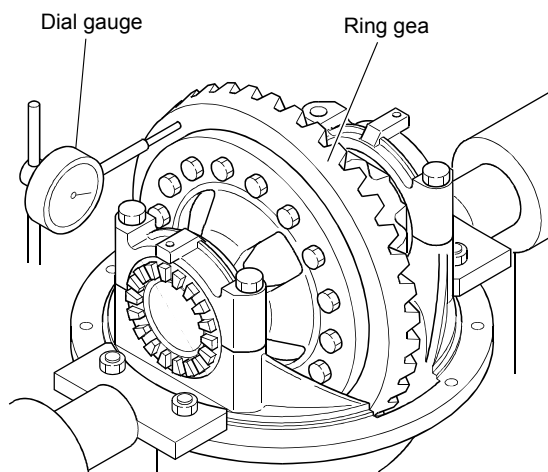
4. After adjustments, tighten cap bolts of side bearing.

Tightening torque: $481 \pm 70 \text{ N}\cdot\text{m}$ $\{355 \pm 52 \text{ ft}\cdot\text{lbf}\}$

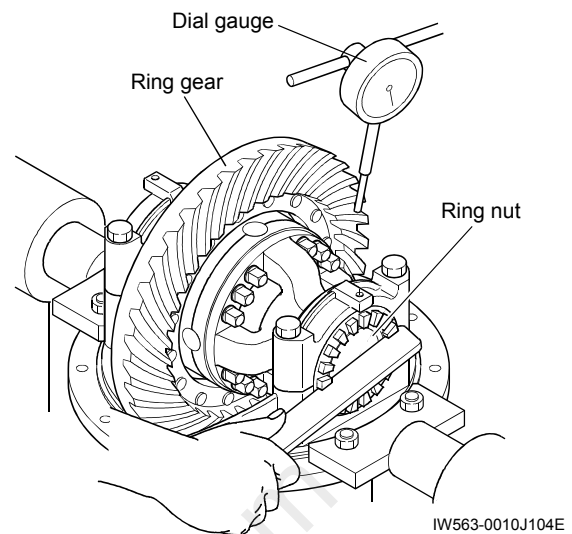
[NOTICE]

- ◆ Apply THREEBOND No.1360k or equivalent to bolt threads.

5. Recheck the runout at the back of ring gear and the backlash.

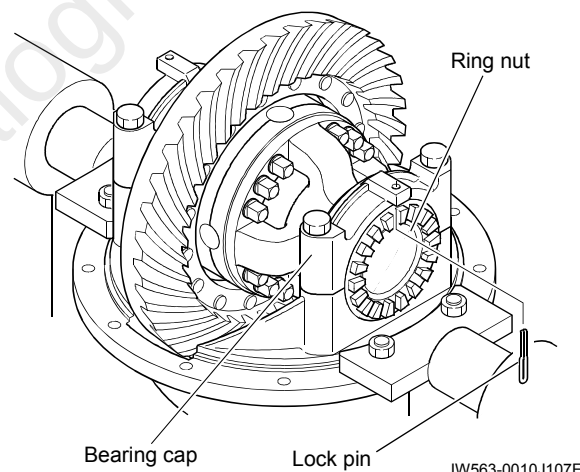


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If unsatisfactory, repeat the whole assembly procedure or replace parts.



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[NOTICE]

- ◆ Be sure to replace lock pin with new one.

- If the results are satisfactory, insert lock pin into bearing cap pin hole.
- If the results do not meet the standard, conduct assembly again or replace parts.

6. Press fit thrust plug on thrust bolt, and screw it into carrier case. After tighten it until it lightly touches the back of ring gear, back off it about 1/8 to 1/6 turn and lock it with lock nut.

Tightening torque: $147 \pm 30 \text{ N}\cdot\text{m}$ $\{108 \pm 15 \text{ ft}\cdot\text{lbf}\}$

Full Version Available

Tadano SHP-S24.0 and SHP-S24.0N Axle Service Manual

Tadano SHP-S24.0, SHP-S24.0N axle service manual covering differential repair, adjustment and troubleshooting. Searchable PDF. Instant PDF download.

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