CHAPTER 7.
DRIVE TRAIN

DRIVE TRAIN

TROUBLESHOOTING

The following conditions may indicate damaged shaft drive components:

Symptoms	Possible Causes
1.A pronounced hesitation or "jerky" movement during acceleration, deceleration, or sustained speed. (This must not be confused with engine surging or transmission characteristics.) 2.A "rolling rumble" noticeable at low speed; a high-pitched whine; a "clunk" from a shaft drive component or area. 3.A locked-up condition of the shaft drive train mechanism, no power transmitted from the engine to the front and/or rear wheel.	A. Bearing damage. B. Improper gear lash. C. Gear tooth damage. D. Broken drive shaft. E. Broken gear teeth. F. Seizure due to lack of lubrication. G. Small foreign objects lodged between the moving parts.

NOTE:

Areas A, B, and C above may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal machine operating noise. If there is reason to believe these components are damaged, remove the components and inspect them.

Inspection notes

1.Investigate any unusual noises.

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The following "noises" may indicate a mechanical defect:

a.A "rolling rumble" noise during coasting, acceleration, or deceleration. The noise increases with front and/or rear wheel speed, but it does not increase with higher engine or transmission speeds.
Diagnosis: Possible wheel bearing damage.

b.A "whining" noise that varies with acceleration and deceleration.
Diagnosis: Possible incorrect reassembly, too-little gear lash.

CAUTION:

Too little gear lash is extremely destructive to the gear teeth. If a test ride following reassembly indicates this condition, stop riding immediately to minimize gear damage.

c.A slight "thunk" evident at low speed operation. This noise must be distinguished from normal machine operation.
Diagnosis: Possible broken gear teeth.

⚠ WARNING

Stop riding immediately if broken gear teeth are suspected. This condition could result in the shaft drive assembly locking up, causing loss of control of the machine and possible injury to the rider.

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2.Inspect:
- Drained oil
  Drained oil shows large amounts of metal particles → Check the bearing for seizure.

NOTE:
A small amount of metal particles in the oil is normal.

3.Inspect:
- Oil leakage

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Oil leakage inspection steps:
- Clean the entire machine thoroughly, then dry it.
- Apply a leak-localizing compound or dry powder spray to the shaft drive.
- Road test the machine for the distance necessary to locate the leak.
  Leakage → Inspect the component housing, gasket, and/or seal for damage.
  Damage → Replace the component.

NOTE:
- An apparent oil leak on a new or nearly new machine may be the result of a rust-preventative coating or excessive seal lubrication.
- Always clean the machine and recheck the suspected location of an apparent leakage.

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Troubleshooting Chart

When basic condition "a" and "b" exist, check the following points:

Elevate and spin both wheels. Feel for wheel bearing damage.
- YES → Replace the wheel bearing. (Refer to "STEERING SYSTEM" and "REAR SHOCK ABSORBER AND SWINGARM" in CHAPTER 8.)
- NO ↓

Check the wheel nuts and hub nuts for tightness.
- NO → Torque to specification. (Refer to "FRONT AND REAR WHEELS" in CHAPTER 8.)
- YES ↓

Check the constant velocity joint. Feel for bearing damage.
- NO → Constant velocity joint bearings and differential gear bearings are probably not damaged. Repeat the test or remove the individual components.
- YES ↓

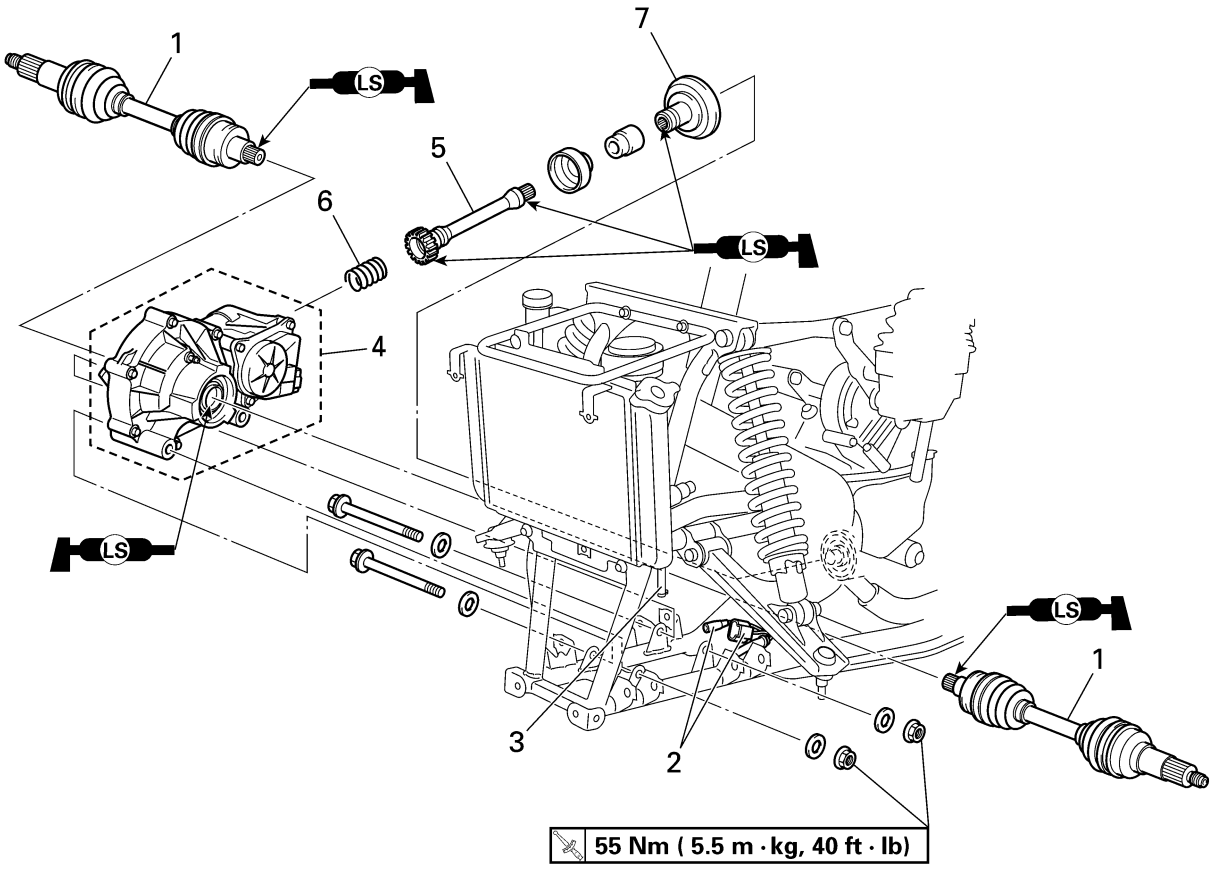
Check the rear brake adjustment.
- NO → Adjust per instructions. (Refer to "REAR BRAKE ADJUSTMENT" in CHAPTER 3.)
- YES ↓

Check the rear axle. Feel for bearing damage.
- NO → Rear axle bearings and rear drive shaft bearings are probably not damaged. Repeat the test or remove the individual components.
- YES ↓

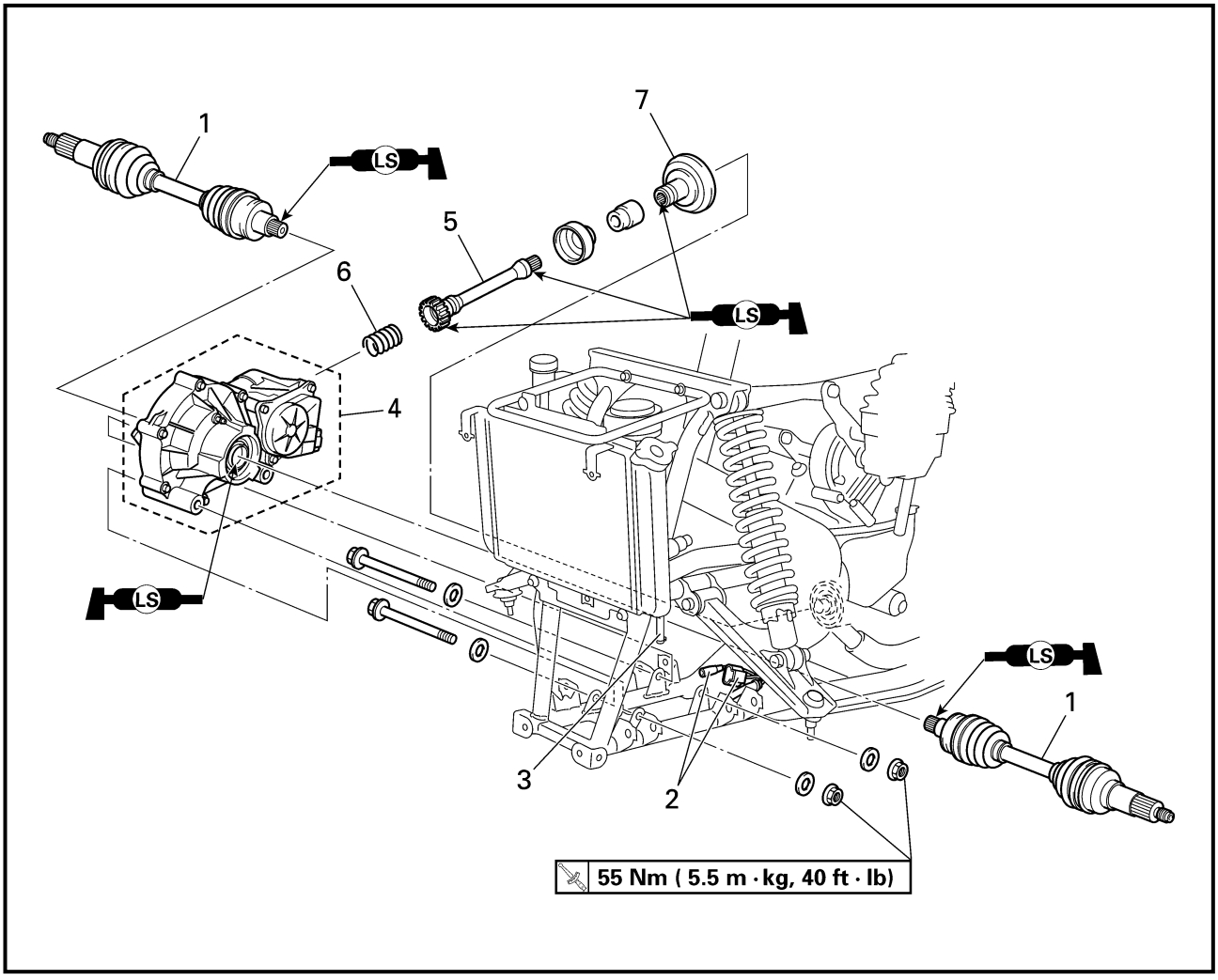
Remove the rear axle. Check for axle bearing damage.
- YES → Replace the rear axle bearing. (Refer to "REAR AXLE/FINAL DRIVE GEAR AND DRIVE SHAFT".)
- NO ↓

Remove the drive shaft components.

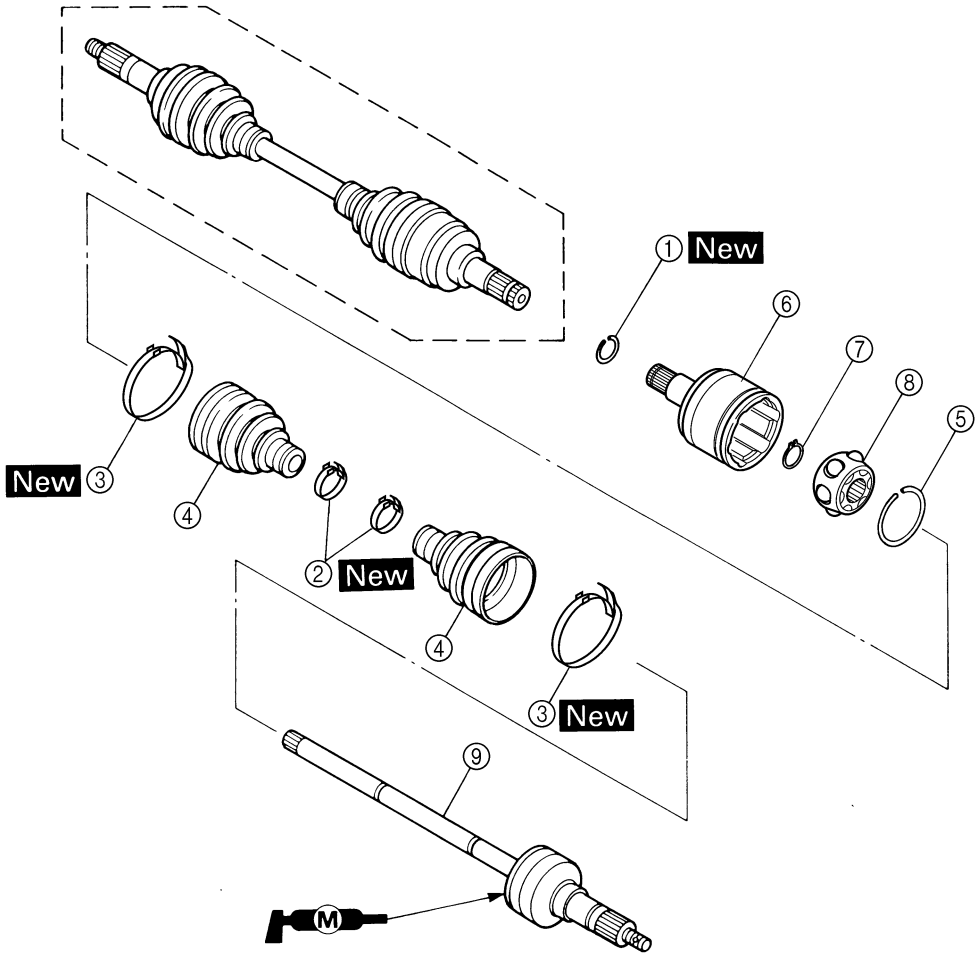
CONSTANT VELOCITY JOINTS AND DIFFERENTIAL GEAR



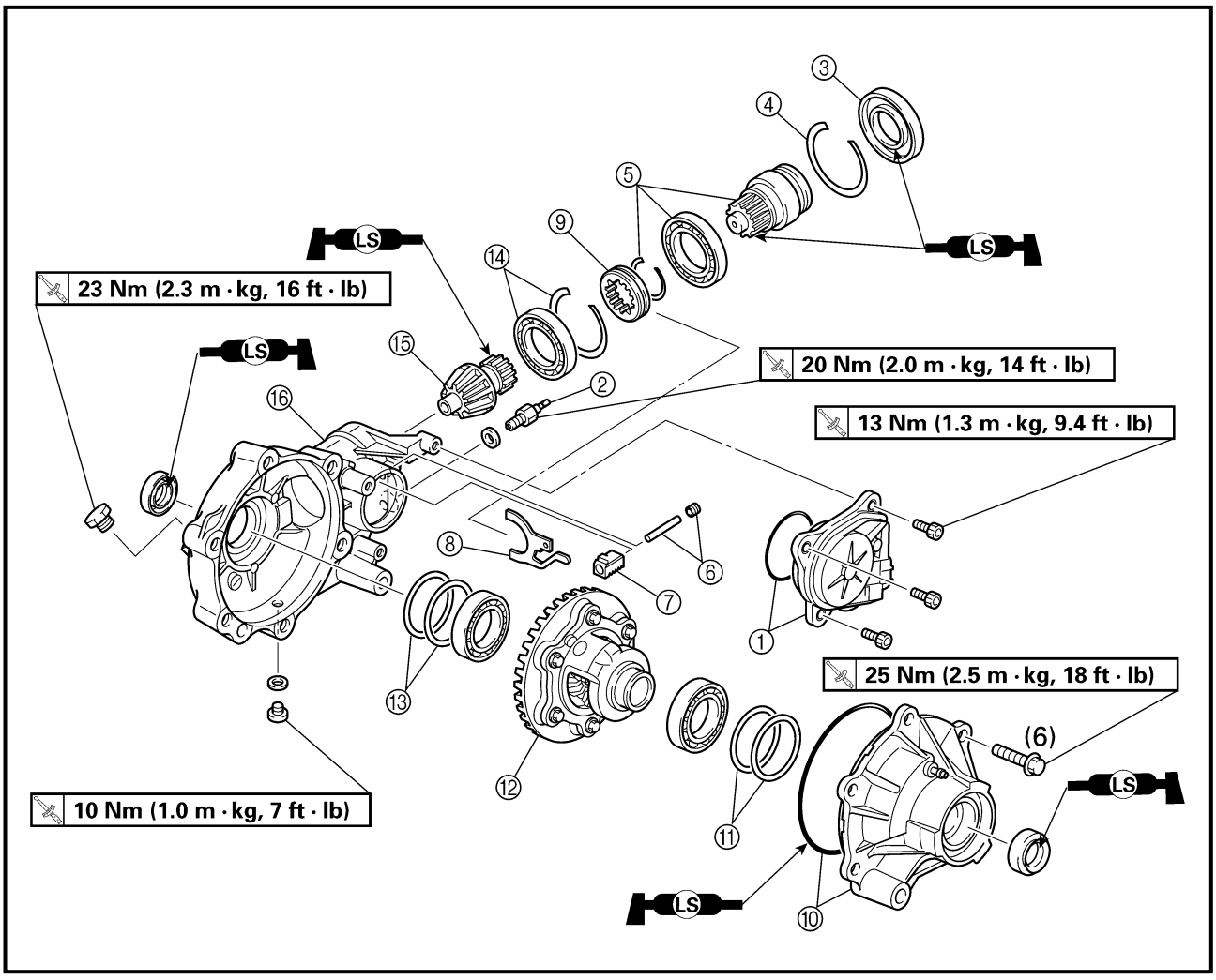
Order	Job name/Part name	Q'ty	Remarks
	Constant velocity joint and differential gear removal		Remove the parts in the order below.
	Engine skid plate (front)		Refer to "SEAT, CARRIERS, FENDERS AND FUEL TANK" in CHAPTER 3.
	Front fender		
	Differential gear oil		Drain.
	Steering knuckle		Refer to "STEERING SYSTEM" in CHAPTER 8.
	Front arms (lower)		Refer to "FRONT ARMS AND FRONT SHOCK ABSORBER" in CHAPTER 8.
1	Constant velocity joint	2	
2	Gear motor coupler/four-wheel drive switch lead	1/1	
3	Differential gear case breather hose	1	Disconnect.



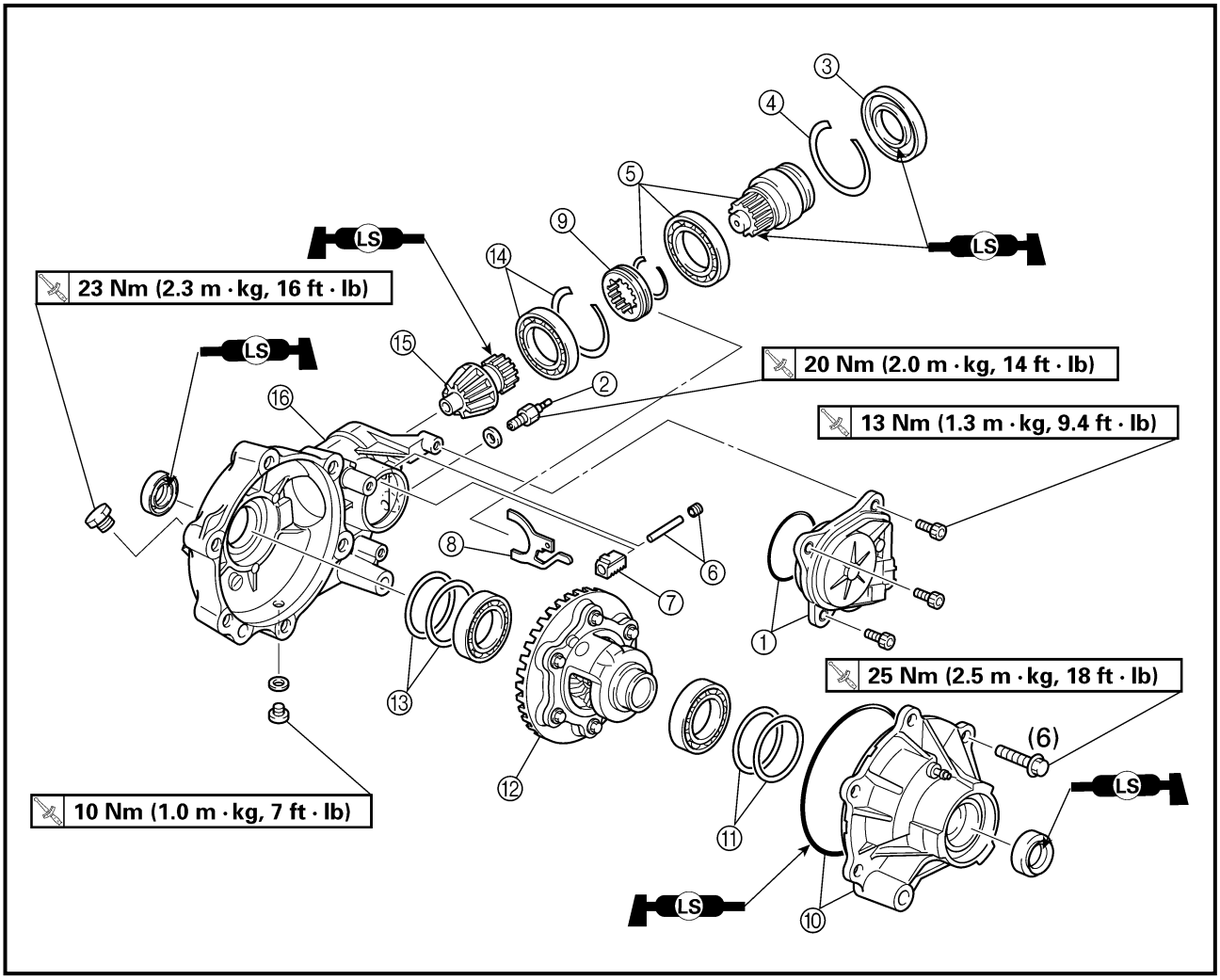
Order	Job name/Part name	Q'ty	Remarks
4	Differential gear	1	
5	Drive shaft	1	
6	Compression spring	1	
7	Coupling gear	1	
			For installation, reverse the removal procedure.



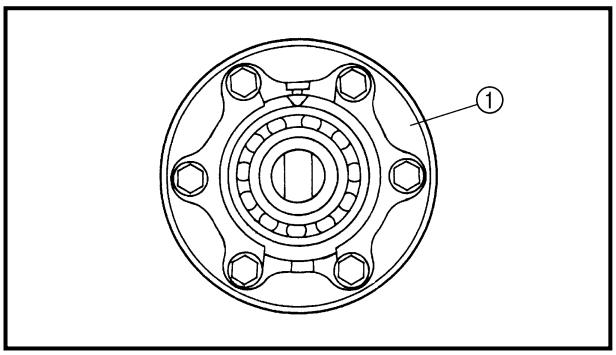
Order	Job name/Part name	Q'ty	Remarks
	Constant velocity joint disassembly		Disassemble the parts in the order below.
①	Circlip	1	
②	Boot band	2	
③	Boot band	2	
④	Dust boot	2	
⑤	Circlip	1	Refer to "CONSTANT VELOCITY JOINT ASSEMBLY".
⑥	Double off-set joint	1	
⑦	Snap ring	1	
⑧	Ball bearing	1	
⑨	Joint shaft assembly	1	
			For assembly, reverse the disassembly procedure.



Order	Job name/Part name	Q'ty	Remarks
	Defferential gear disassembly		Disassembly the parts in the order below.
①	Gear motor/O-ring	1/1	
②	Four-wheel drive switch	1	
③	Dust seal	1	
④	Circlip	1	
⑤	Coupling gear/bearing/circlip	1/1/1	
⑥	Stopper bolt/shaft	1/1	
⑦	Shift fork sliding gear	1	
⑧	Shift fork	1	
⑨	2WD/4WD shift sleeve	1	
⑩	Differential gear case cover	1	
⑪	Shim (left)		
⑫	Differential gear assembly	1	



Order	Job name/Part name	Q'ty	Remarks
⑬	Shim (right)	1	
⑭	Circlip/bearing	1/1	
⑮	Drive pinion gear	1	
⑯	Differential gear case	1	
			For assembly, reverse the disassembly procedure.



RING GEAR REMOVAL

1.Remove:
- Ring gear ①

NOTE:

The ring gear and the differential gear cover should be fastened together. Do not disassemble the differential gear.

CAUTION:

The differential gears are assembled into a proper unit at the factory by means of specialized equipment. Do not attempt to disassemble this unit. Disassembly will result in the malfunction of the unit.

CONSTANT VELOCITY JOINT INSPECTION

1.Inspect:
- Double off-set joint spline
- Ball joint spline
- Shaft spline

  Wear/damage → Replace.

2.Inspect:
- Dust boots

  Cracks/damage → Replace.

CAUTION:

Always use a new boot band.

3.Inspect:
- Balls and ball races
- Inner surface of double off-set joint

  Pitting/wear/damage → Replace.

DIFFERENTIAL GEAR INSPECTION

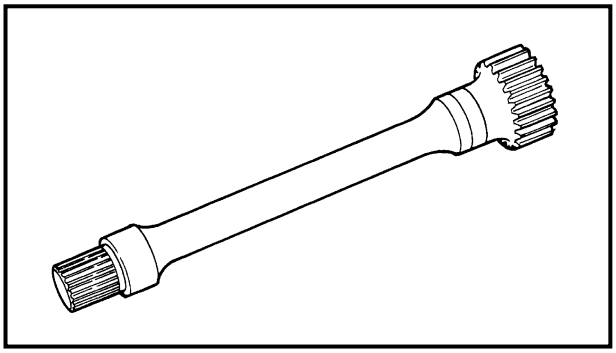
1.Inspect:
- Gear teeth

  Pitting/galling/wear → Replace drive pinion gear and ring gear as a set.
- Bearing

  Pitting/damage → Replace.
- Oil seal
- O-ring

  Damage → Replace.

2.Inspect:
- Drive shaft splines
- Universal joints
- Front drive gear splines
  Wear/damage → Replace.
- Spring
  Fatigue → Replace.
  Move the spring up and down.



3.Inspect:
- Front drive shaft
  Bends → Replace.

⚠ WARNING

Do not attempt to straighten a bent shaft; this may dangerously weaken the shaft.

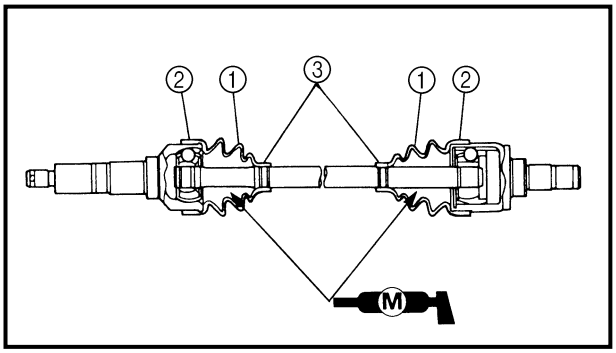
CONSTANT VELOCITY JOINT ASSEMBLY

1.Apply:
- Molybdenum disulfide grease
  (into the ball joint assembly)

NOTE:

Molybdenum disulfide grease is included in the repair kit.

2.Install:
- Dust boots ①
- Boot bands ②, ③ New



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Installation steps:
- Apply molybdenum disulfide grease into the dust boots.

	Molybdenum disulfide grease: 40 g (1.4 oz) per dust boot

- Install the dust boots.
- Install the dust boot bands.

NOTE:
- The new boot bands may differ from the original ones.
- The dust boots should be fastened with the boot bands ③ at the grooves in the joint shaft.

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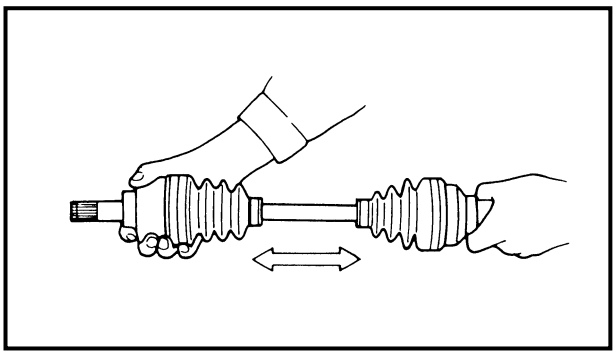
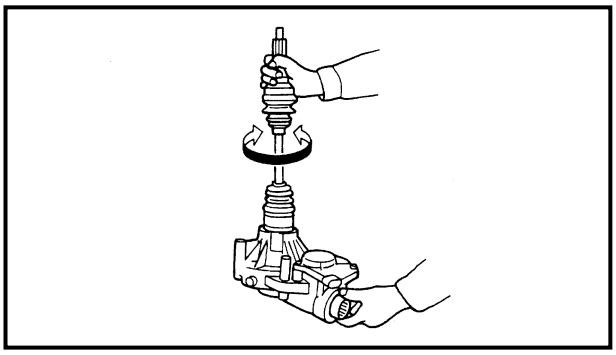


3.Check:
- Free play (thrust movement)
  Excessive play → Replace the joint assembly.

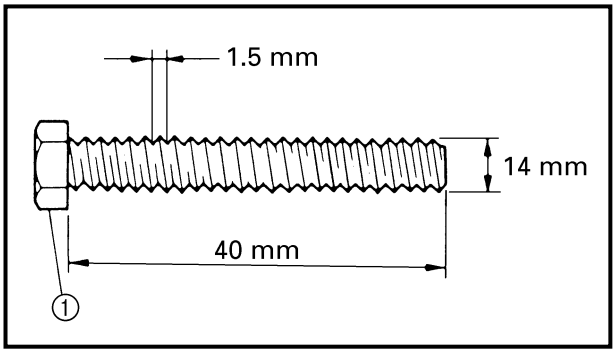
DIFFERENTIAL GEAR ASSEMBLY

1.Measure:
- Gear lash
  Refer to "DIFFERENTIAL GEAR LASH MEASUREMENT AND ADJUSTMENT".

2.Install:
- Gear motor
  Refer to "FEATURES" in CHAPTER 1.



3.Check:
- Differential gear operation
  Unsmooth operation → Replace the differential gear assembly.
  Insert the double off-set joint into the differential gear, and turn the gear back and forth.



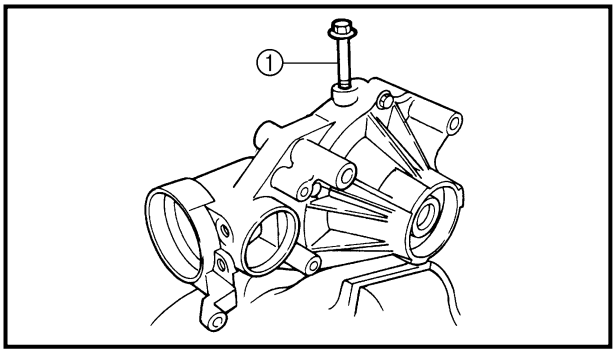
DIFFERENTIAL GEAR LASH MEASUREMENT AND ADJUSTMENT

Differential gear lash measurement

1.Secure the gear case in a vise or another supporting device.

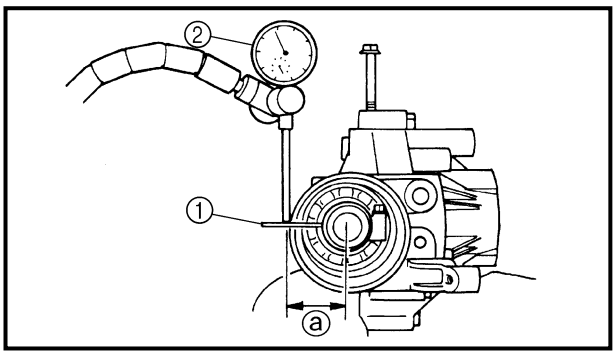
2.Remove:
- Drain plug
- Gasket

3.Install:
- A bolt of the specified size ①
  (into the drain plug hole)



CAUTION:

Finger tighten the bolt until it holds the ring gear. Otherwise, the ring gear will be damaged.



4.Attach:
- Gear lash measurement tool ①
- Dial gauge ②

Gear lash measurement tool:
P/N. YM-01475, 90890-01475

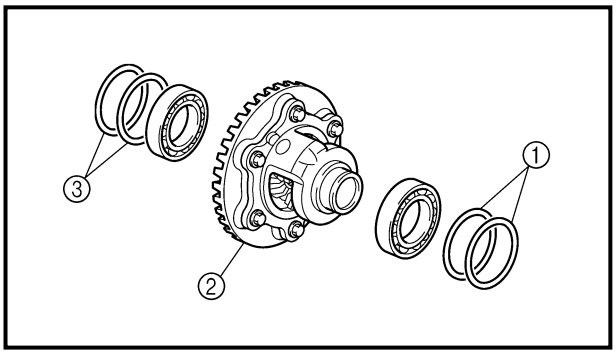
ⓐ Measuring point is 30 mm (1.18 in)

5.Measure:
- Gear lash

  Gently rotate the gear coupling from engagement to engagement.

Differential gear lash:
0.08 ~ 0.39 mm (0.003 ~ 0.015 in)

NOTE:
Measure the gear lash at four positions. Rotate the shaft 90° each time.



Differential gear lash adjustment

1.Remove:
- Shim(s) (left) ①
- Differential gear assembly ②
- Shim(s) (right) ③

2.Adjust:
- Gear lash

****

Gear lash adjustment steps:

- Select the suitable shims using the following chart.

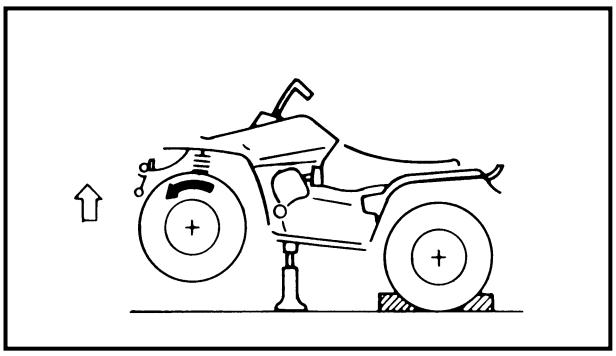
Too little gear lash	**Reduce shim thickness.**
Too large gear lash	**Increase shim thickness.**

- If it is necessary to increase by more than 0.05 mm (0.002 in):

  Reduce right shim thickness by 0.1 mm (0.004 in) for every 0.1 mm (0.004 in) of left shim increase.
- If it is necessary to reduce by more than 0.1 mm (0.004 in):

  Increase right shim thickness by 0.1 mm (0.004 in) for every 0.1 mm of left shim decreased.

Ring gear shim (left and right)	
Thickness (mm)	0.1 1.0 0.2 1.5 0.3 2.0 0.4 2.5 0.5



DIFFERENTIAL GEAR OPERATION CHECK

1. Block the rear wheels, and elevate the front wheels by placing a suitable stand under the frame.
2. Remove the wheel cap and cotter pin from the axle nut (right or left).
3. Measure the starting torque of the front wheel (i.e., differential gear preload) with the torque wrench.

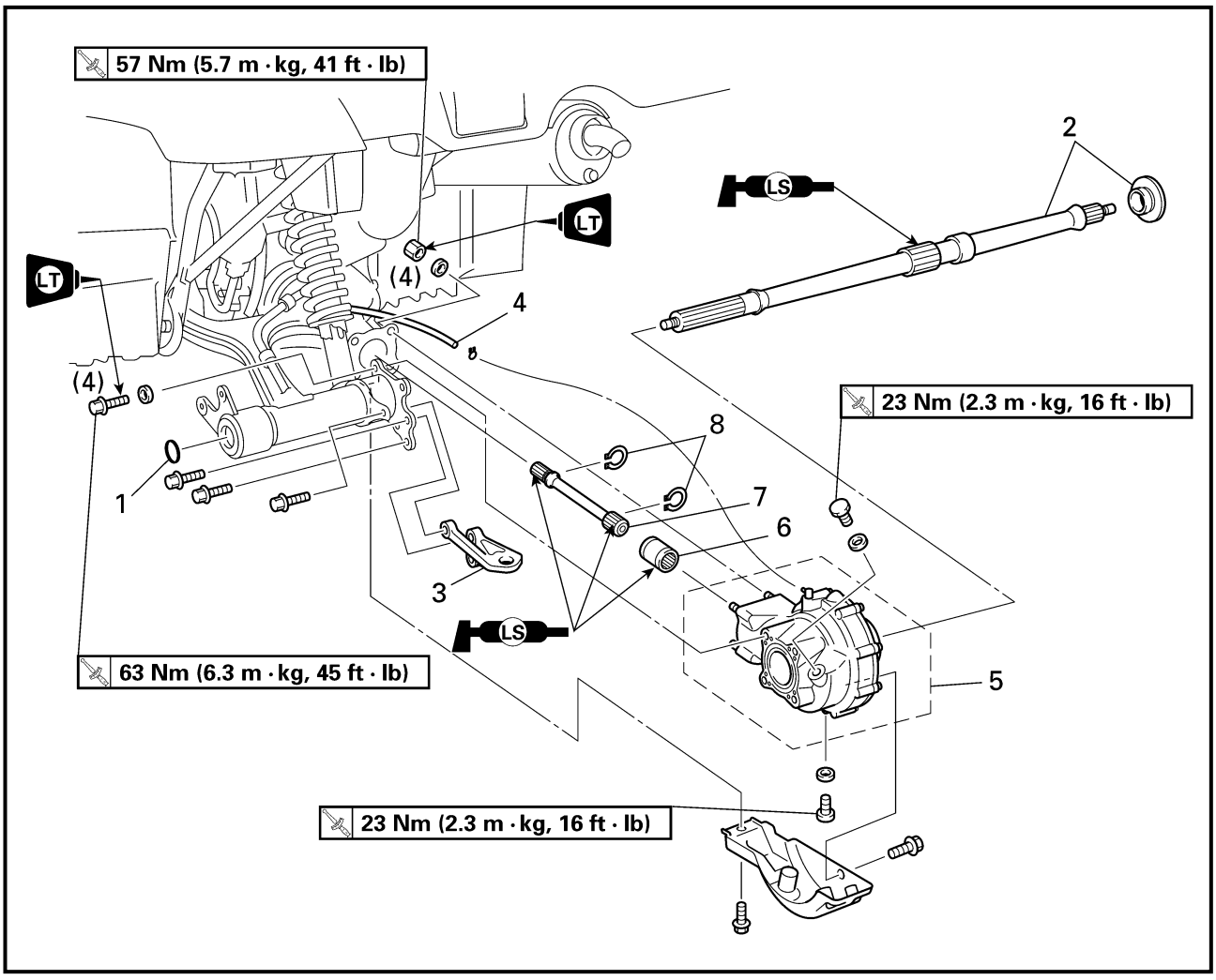
NOTE:

- Repeat this step several times to obtain an average figure.
- During this test, the other front wheel will turn in the opposite direction.

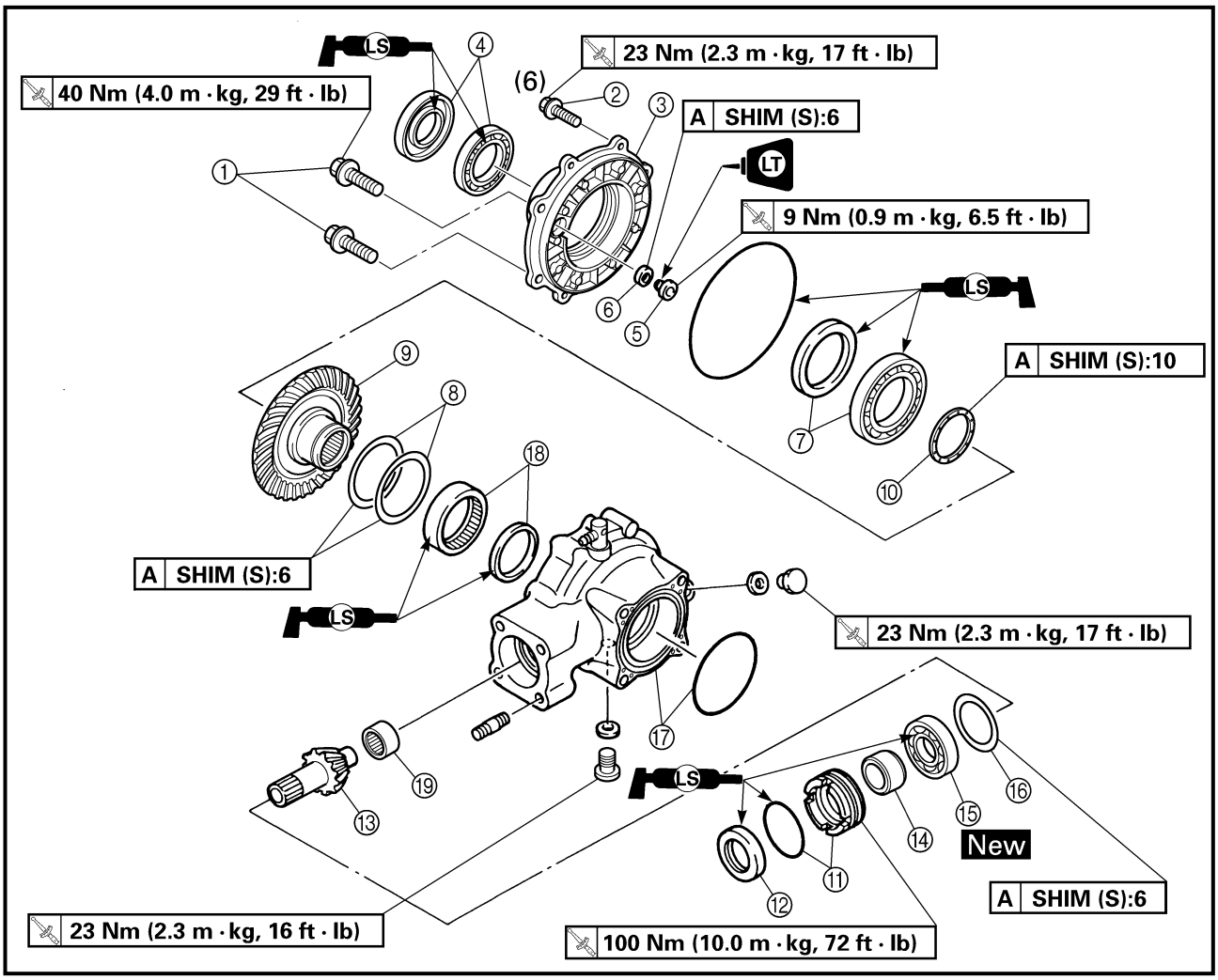
Front wheel starting torque (differential gear preload):
New unit:
17 ~ 25 Nm
(1.7 ~ 2.5 m • kg, 12 ~ 18 ft • lb)
Minimum:
10 Nm (1.0 m • kg, 7.2 ft • lb)

4. Out of specification → Replace the differential gear assembly.
5. Within specification → Install the new cotter pin and wheel cap.

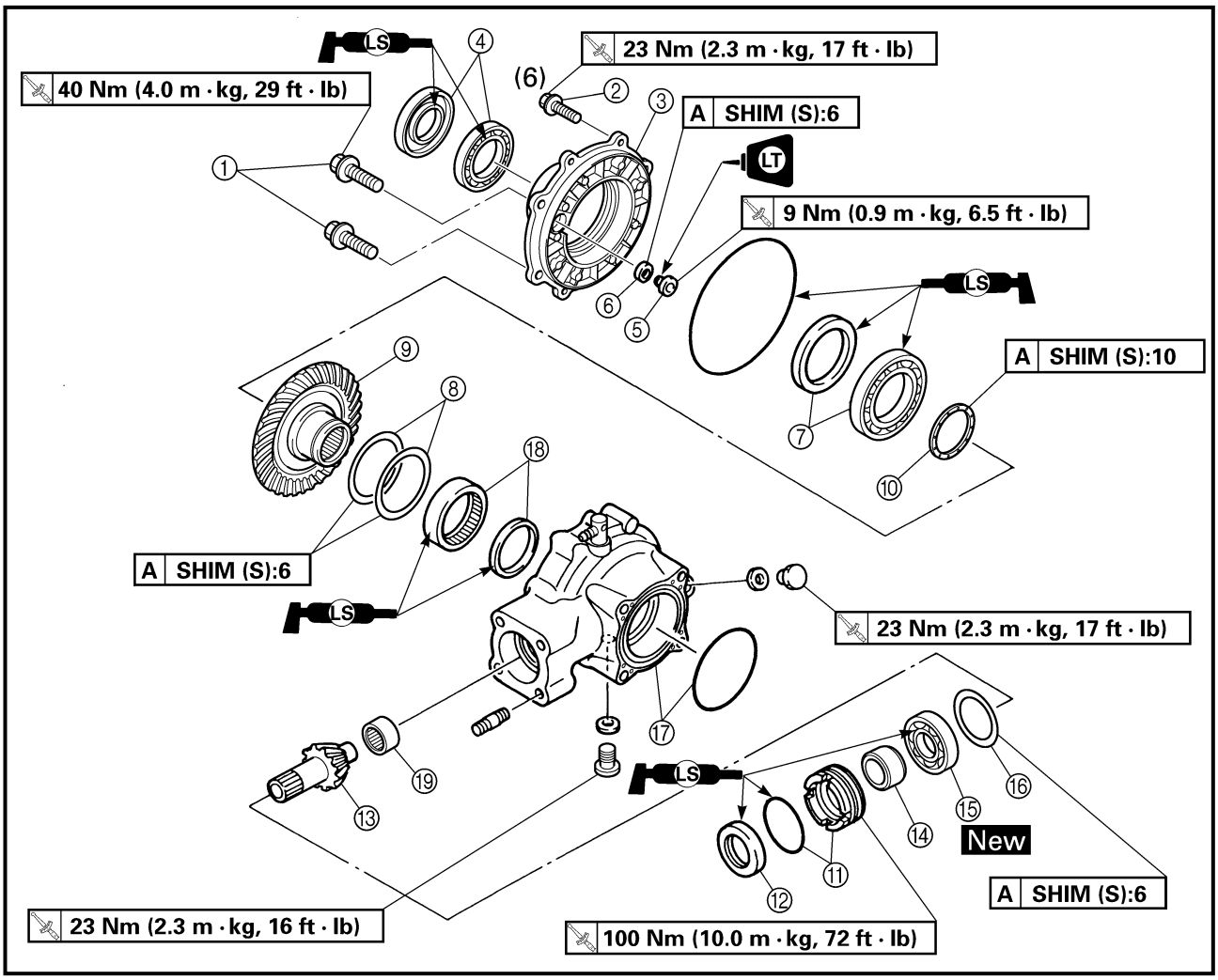
REAR AXLE/FINAL DRIVE GEAR AND DRIVE SHAFT



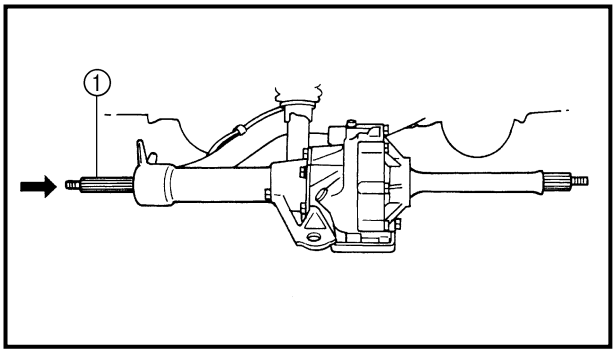
Order	Job name/Part name	Q'ty	Remarks
	Rear axle, final drive gear assembly and drive shaft removal		Remove the parts in the order below.
	Final gear oil		Drain.
	Rear wheel hubs/brake disc		Refer to "FRONT AND REAR WHEELS" in CHAPTER 8.
1	O-ring	1	
2	Rear axle/dust cover	1/1	
3	Trailer hitch bracket	1	
4	Final drive gear case breather hose	1	Disconnect. Refer to "REAR AXLE REMOVAL/INSTALLATION".
5	Final drive gear	1	
6	Coupling gear	1	
7	Drive shaft	1	
8	Circlip	2	
			For installation, reverse the removal procedure.

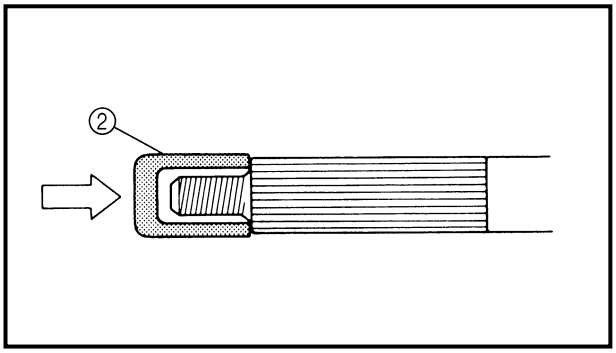


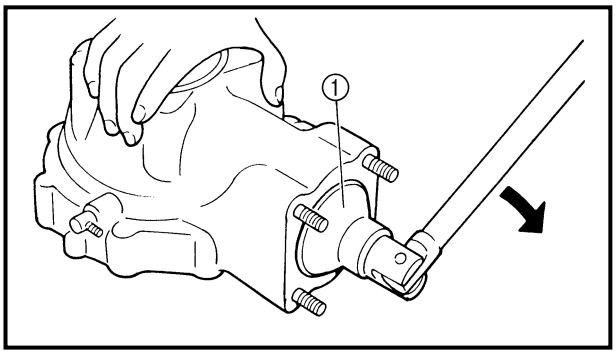
Order	Job name/Part name	Q'ty	Remarks
	Final drive gear disassembly		Disassemble the parts in the order below.
①	Bolt	2	**NOTE:**
②	Bolt	6	Working in a crisscross pattern, loosen each bolt 1/4 of a turn. After all the bolts are loosened, remove them.
③	Bearing housing	1	
④	Oil seal/bearing	1/1	
⑤	Ring gear stopper	1	
⑥	Ring gear stopper shim	1	
⑦	Oil seal/bearing	1/1	
⑧	Ring gear shim	1	
⑨	Ring gear	1	
⑩	Thrust washer	1	



Order	Job name/Part name	Q'ty	Remarks
⑪	Bearing retainer/O-ring	1/1	
⑫	Oil seal	1	
⑬	Final drive pinion gear	1	Refer to "FINAL DRIVE GEAR DISASSEMBLY/ASSEMBLY".
⑭	Collar	1	
⑮	Bearing	1	
⑯	Final drive pinion gear shim	1	
⑰	Final drive gear case/O-ring	1/1	
⑱	Bearing/oil seal	1/1	Refer to "FINAL DRIVE ROLLER BEARING REMOVAL AND REASSEMBLY".
⑲	Bearing	1	Refer to "FINAL DRIVE ROLLER BEARING REMOVAL AND REASSEMBLY". For assembly, reverse the disassembly procedure.







REAR AXLE REMOVAL

1.Remove:
- Rear axle ①
  (with dust seal)
- O-ring

CAUTION:

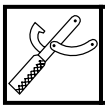
- **Never directly tap the axle end with a hammer, since this will result in damage to the axle thread and spline.**
- **Attach a suitable socket ② on the axle end and tap it with a soft hammer. Pull out the rear axle to the right.**

FINAL DRIVE GEAR DISASSEMBLY

1.Remove:
- Bearing retainer (final drive pinion gear)

NOTE:

Use a bearing retainer wrench ①.



Bearing retainer wrench:
P/N. YM-04050, 90890-04050

CAUTION:

The final drive shaft bearing retainer has left-handed threads. To loosen the retainer, turn it clockwise.

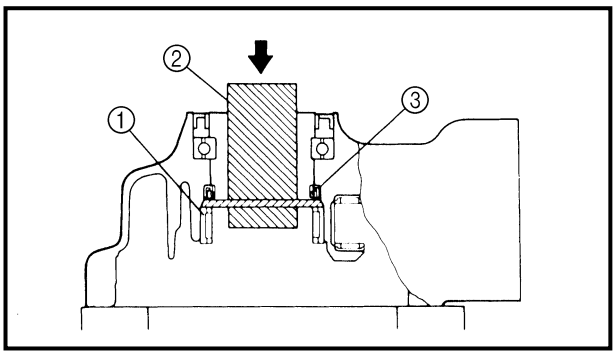
2.Remove:
- Final drive pinion gear assembly
  With a soft hammer, lightly tap on the final drive pinion gear end.

CAUTION:

Removal of the final drive pinion gear should only be performed if gear replacement is necessary.

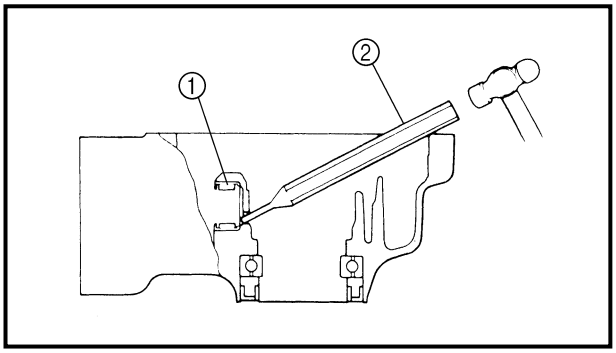
⚠ WARNING

Always use new bearings and races.



FINAL DRIVE ROLLER BEARING REMOVAL AND REASSEMBLY

1.Remove:
- Roller bearing (ring gear) ①
  Use a suitable press tool ② and an appropriate support for the main housing.
- Oil seal ③



2.Remove:
- Roller bearing (final drive pinion gear) ①

****

Removal steps:
- Heat the main housing only to 150 °C (302 °F).
- Remove the roller bearing outer race with an appropriately shaped punch ②.
- Remove the inner race from the final drive pinion gear.

NOTE:
The removal of the final drive pinion gear roller bearing is difficult and seldom necessary.

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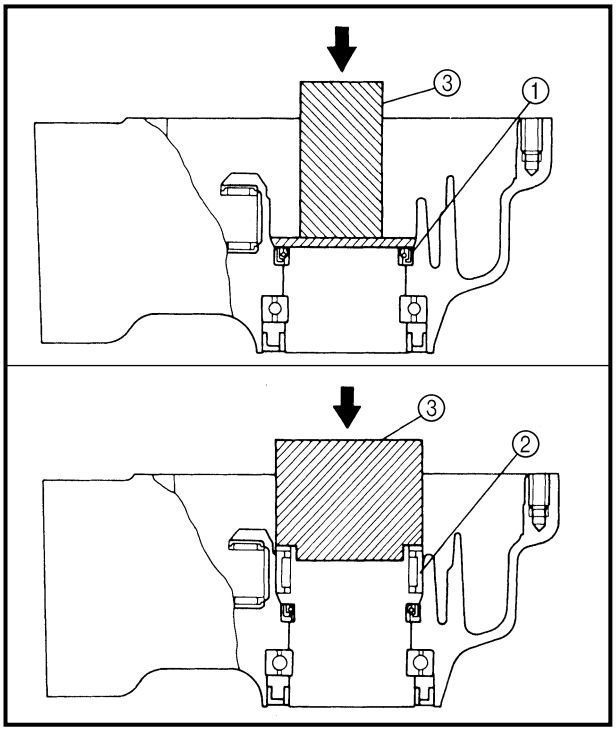


3.Install:
- Roller bearing (final drive pinion gear) New

****

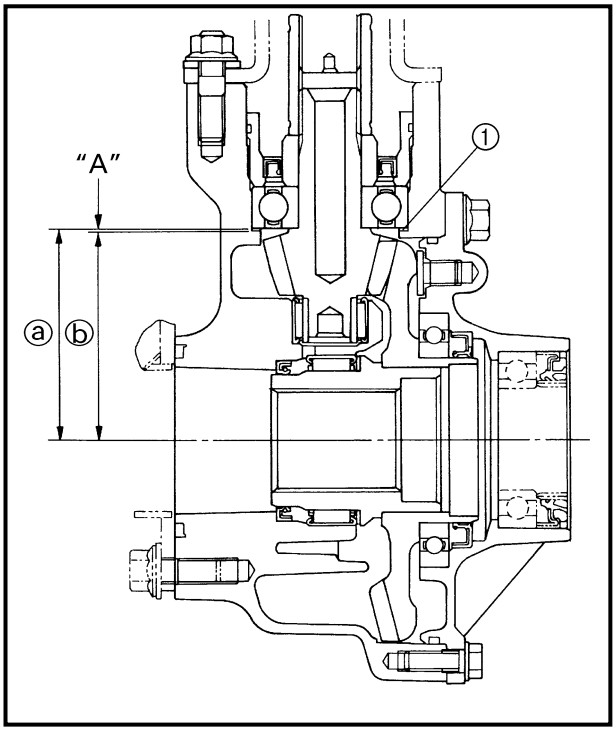
Installation steps:
- Heat the main housing only to 150 °C (302 °F).
- Install the roller bearing outer race using the proper adapter.
- Install the inner race onto the drive pinion gear.

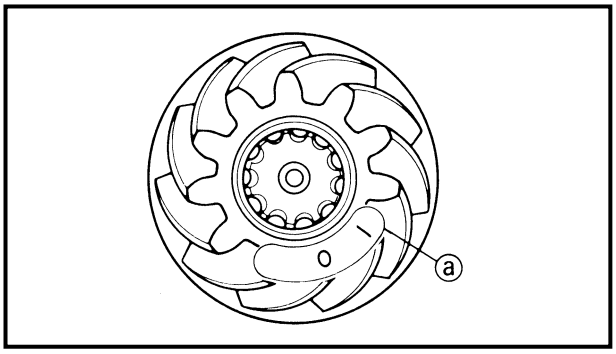
****

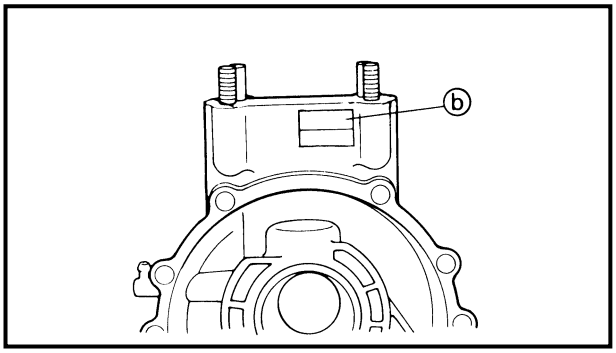
4.Install:
- Oil seal ① New
- Roller bearing ②
  Use a suitable press tool ③ and a press to install the above components into the main housing.

FINAL DRIVE PINION GEAR AND RING GEAR POSITIONING

When the final drive pinion gear, ring gear, final gear case and/or ring gear bearing housing are replaced, be sure to adjust the positions of the final drive pinion gear and ring gear using the shim(s).







Final drive pinion gear shim selection

1.Select:

- Final drive pinion gear shim(s) ①

****

Shim selection steps:

- To find the final drive pinion gear shim thickness "A", use the following formula.

Final drive pinion gear shim thickness:
"A" = ⓐ – ⓑ

ⓐ = a numeral (usually a decimal number) on the final drive pinion gear either added to or subtracted from "84"

ⓑ = a numeral (usually a decimal number) on the final gear case either added to or subtracted from "83"

Example:

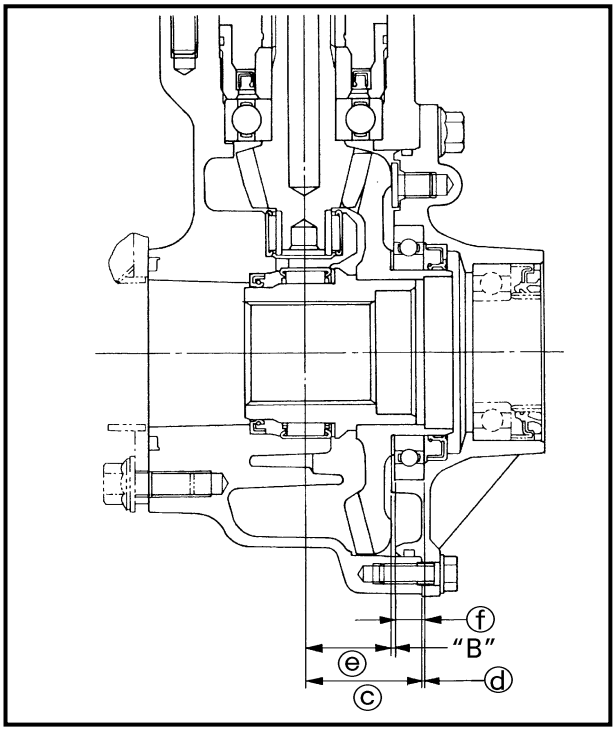
1) If "01" is stamped on the final drive pinion gear,
   ⓐ = 84 + 0.01 = 84.01
2) If "50" is stamped on the final gear case,
   ⓑ = 83 + 0.50 = 83.50
3) Therefore, "A" is 0.51.
   "A"= 84.01 – 83.50
   = 0.51
4) Round off the hundredth digit and select the appropriate shim(s).
   In the example above, the calculated number is 0.51. The chart instructs you to round off 1 to 0 at the hundredth place. Thus, the shim thickness is 0.50 mm.

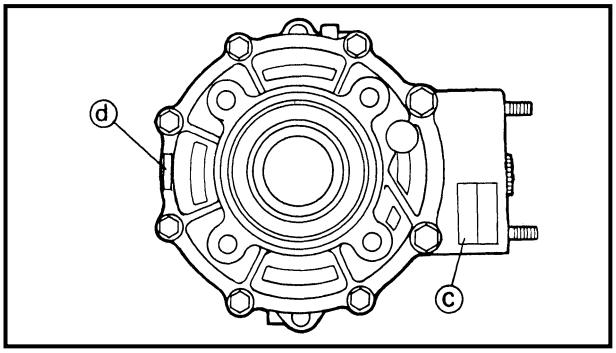
Hundredths	Rounded value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

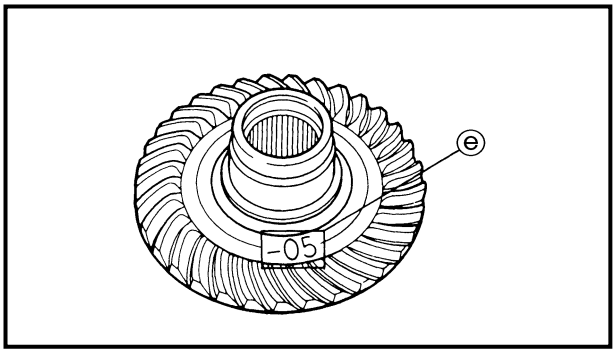
Shims are supplied in the following thicknesses.

Final drive pinion gear shim			
Thickness (mm)	0.15 0.45	0.30 0.50	0.40 0.60

****







Ring gear shim selection

1.Select:

- Ring gear shim(s) ①

****

Shim selection steps:

- To find the ring gear shim thickness "B", use the following formula.

Ring gear shim thickness:
"B" = ⓒ + ⓓ – (ⓔ + ⓕ)

ⓒ = a numeral (usually a decimal number) on the final gear case either added to or subtracted from 45
ⓓ = a numeral (usually a decimal number) on the outside of the ring gear bearing housing and added to 1
ⓔ = a numeral (usually a decimal number) on the inside of the ring gear either added to or subtracted from 35.00
ⓕ = bearing thickness (considered constant)

Bearing thickness ⓕ:
11.00 mm

Example:

1) If "53" is stamped on the final gear case,
   ⓒ = 45 + 0.53 = 45.53
2) If "05" is stamped on the ring gear bearing housing,
   ⓓ = 1 + 0.05
   = 1.05
3) If "–05" is stamped on the ring gear,
   ⓔ = 35 – 0.05
   = 34.95
4) ⓕ = 11.00.

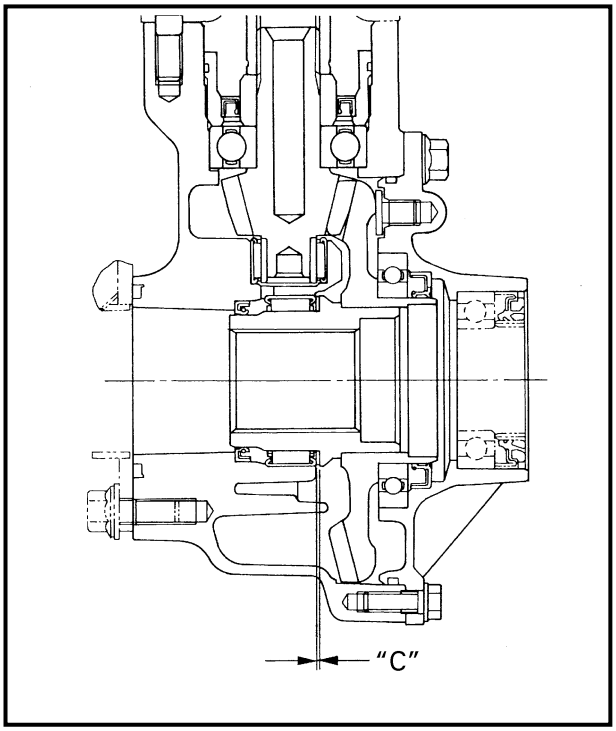
5) Therefore, shim thickness "B" is 0.63.
"B"= 45.53 + 1.05 – (34.95 + 11.00)
= 46.58 – 45.95
= 0.63
6) Round off the hundredth digit and select the appropriate shim(s).
In the example above, the calculated number is 0.63. The chart instructs you to round off 3 to 5 at the hundredth place.
Thus, the shim thickness is 0.65 mm.

Hundredths	Rounded value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

Shims are supplied in the following thicknesses.

Ring gear shim			
Thickness (mm)	0.25 0.40	0.30 0.45	0.35 0.50

****



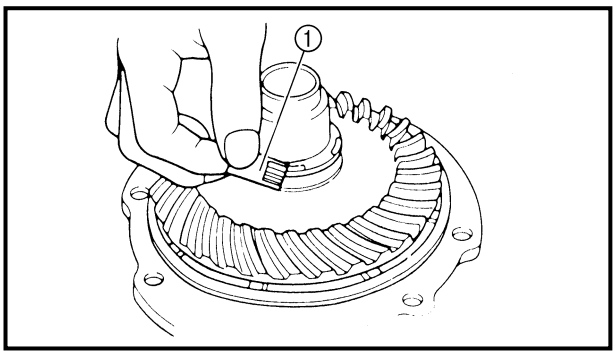
Thrust washer selection
1.Measure/select:
- Ring gear thrust clearance "C"

****

Thrust clearance measurement steps:
- Place four pieces of Plastigauge® between the originally fitted thrust washer and the ring gear.
- Install the ring gear assembly and tighten the bolts to specification.

M8 Bolts (bearing housing):
23 Nm (2.3 m • kg, 17 ft • lb)
M10 Bolts (bearing housing):
40 Nm (4.0 m • kg, 29 ft • lb)

NOTE:
Do not turn the drive pinion gear and ring gear when measuring the clearance with Plastigauge®.



- Remove the ring gear assembly.
- Measure the thrust clearance. Calculate the width of the flattened Plastigauge® ①.

	Ring gear thrust clearance: 0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

- If out of specification, select the correct washer.

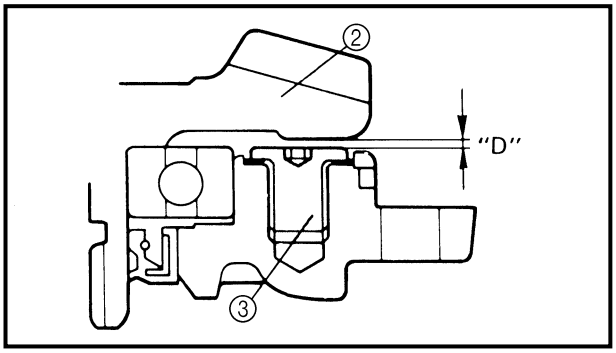
Thrust washer selection steps:

- Select a suitable thrust washer using the following chart.

	Thrust washer		
Thickness (mm)	**1.2** **1.5** **1.8** **2.1**	**1.3** **1.6** **1.9**	**1.4** **1.7** **2.0**

- Repeat the measurement steps until the ring gear thrust clearance is within the specified limits.

****



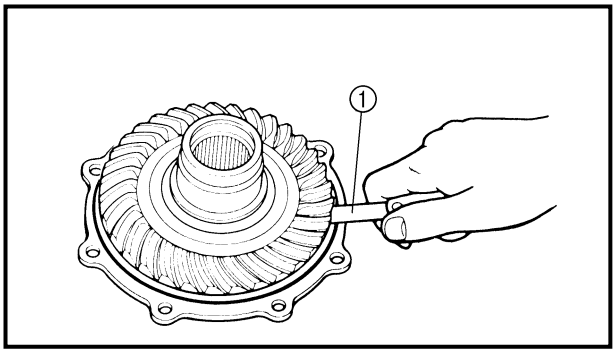
Ring gear stopper shim selection

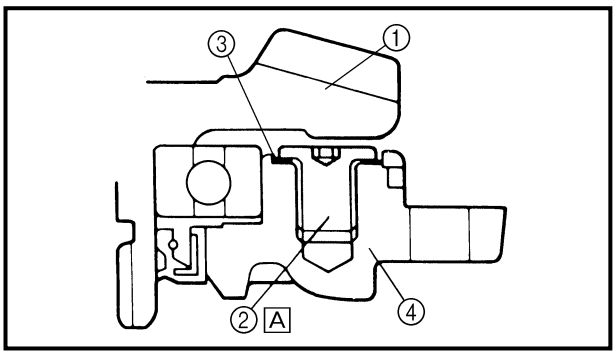
1.Measure:

- Ring gear stopper clearance "D"
  Use a feeler gauge ①.
  Out of specification → Adjust.

	Ring gear stopper clearance "D": 0.30 ~ 0.60 mm (0.012 ~ 0.024 in)

② Ring gear
③ Ring gear stopper





Ring gear stopper clearance adjustment

1.Remove:
- Ring gear ①
- Ring gear stopper ②
- Shim(s) ③

④ Bearing housing
A Left-hand threads

2.Select:
- Suitable shim(s)

Shim			
Thickness (mm)	0.10 0.30	0.15 0.40	0.20 0.50

3.Install:
- Shim(s)
- Ring gear stopper (left-hand threads)

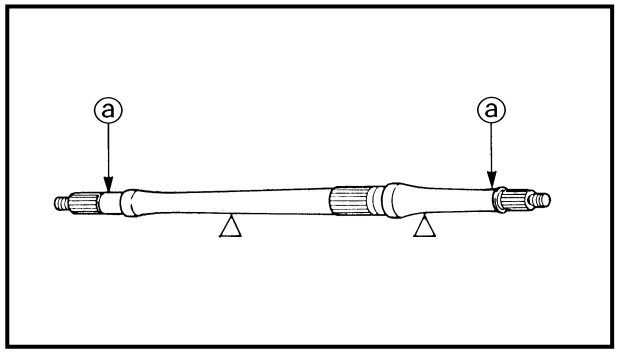
9 Nm (0.9 m • kg, 6.5 ft • lb)

- Ring gear

NOTE:
Use LOCTITE® on the ring gear stopper.

4.Measure:
- Ring gear stopper clearance
  Out of specification → Repeat adjustment steps.

Ring gear stopper clearance:
0.30 ~ 0.60 mm (0.012 ~ 0.024 in)



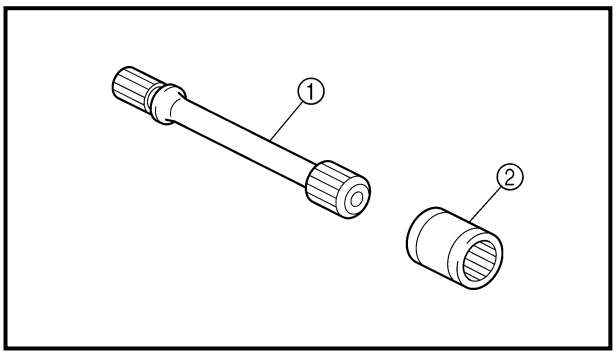
REAR AXLE INSPECTION

1.Inspect:
- Rear axle runout ⓐ
  Out of specification → Replace.

⚠ WARNING

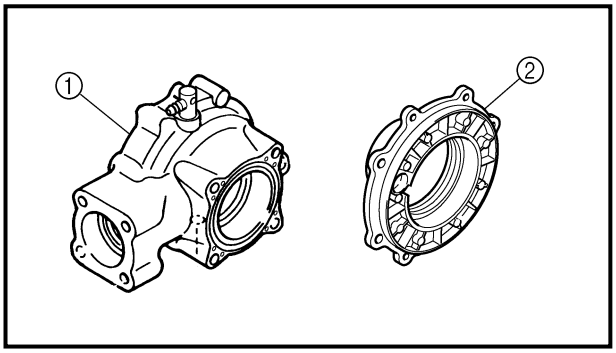
Do not attempt to straighten a bent axle.

Rear axle runout limit:
1.5 mm (0.06 in)



DRIVE SHAFT INSPECTION

1.Inspect:
- Drive shaft (splines) ①
- Coupling gear (splines) ②
  Wear/damage → Replace.



FINAL DRIVE GEAR INSPECTION

1.Inspect:
- Final gear case ①
- Bearing housing (ring gear) ②
  Cracks/damage → Replace.

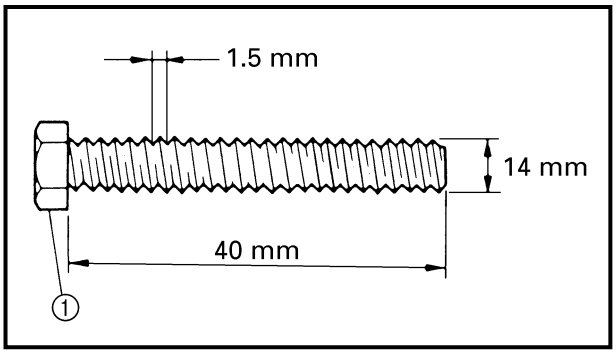
NOTE:

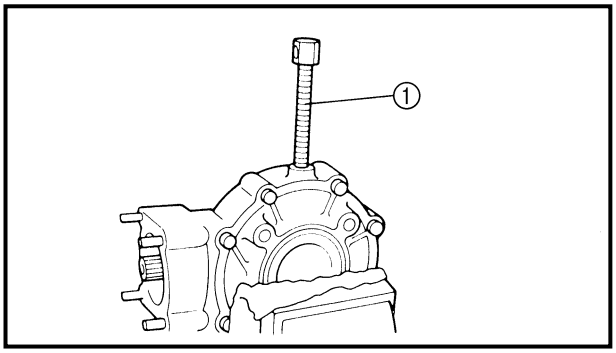
When the final gear case and/or the ring gear bearing housing are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear.

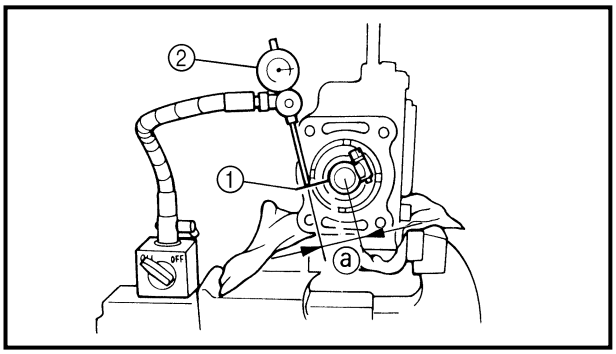
2.Inspect:
- Gear teeth
  Pitting/galling/wear → Replace the drive pinion gear and ring gear as a set.
- Oil seals
- O-rings
  Damage → Replace.

3.Inspect:
- Bearings
  Damage → Replace.

NOTE:
- Reusing roller bearings is acceptable, but Yamaha recommends installing new ones. Do not reuse the oil seal.
- When the final drive pinion gear and/or ring gear are replaced, be sure to adjust the shim of the final drive pinion gear and/or ring gear.







FINAL GEAR LASH MEASUREMENT AND ADJUSTMENT

Final gear lash measurement

1.Secure the gear case in a vise or another supporting device.

2.Remove:

- Drain plug
- Gasket

3.Install:

- A bolt of the specified size ①
  (into the drain plug hole)

CAUTION:

Finger tighten the bolt until it holds the ring gear. Otherwise, the ring gear will be damaged.

4.Attach:

- Gear lash measurement tool ①
- Dial gauge ②

Gear lash measurement tool:
P/N. YM-01231, 90890-01231

ⓐ Measuring point is 27 mm (1.06 in)

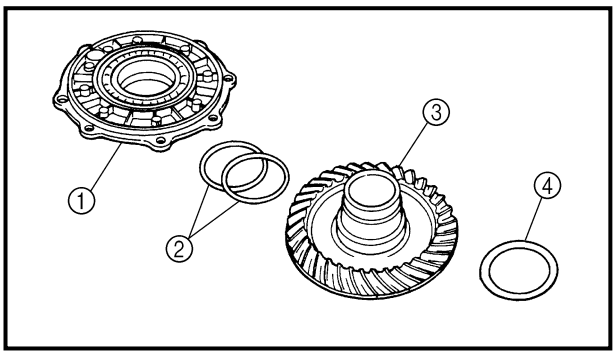
5.Measure:

- Gear lash
  Gently rotate the gear coupling from engagement to engagement.

Final gear lash:
0.1 ~ 0.2 mm (0.004 ~ 0.008 in)

NOTE:

Measure the gear lash at four positions. Rotate the shaft 90° each time.



Final gear lash adjustment

1.Remove:

- Bearing housing ①
- Ring gear shim(s) ②
- Ring gear ③
- Thrust washer ④

2.Adjust:

- Gear lash

****

Adjustment steps:

- Select a suitable shim(s) and thrust washer(s) using the following chart.

Too little gear lash	**Reduce shim thickness.**
Too large gear lash	**Increase shim thickness.**

- If increased by more than 0.2 mm (0.008 in):
  Reduce the thrust washer thickness by 0.2 mm (0.008 in) for every 0.2 mm of ring gear shim increase.
- If reduced by more than 0.2 mm (0.008 in):
  Increase the thrust washer thickness by 0.2 mm (0.008 in) for every 0.2 mm that the ring gear shim is decreased.

Ring gear shim			
Thickness (mm)	**0.25** **0.40**	**0.30** **0.45**	**0.35** **0.50**

Thrust washer			
Thickness (mm)	**1.2** **1.5** **1.8** **2.1**	**1.3** **1.6** **1.9**	**1.4** **1.7** **2.0**

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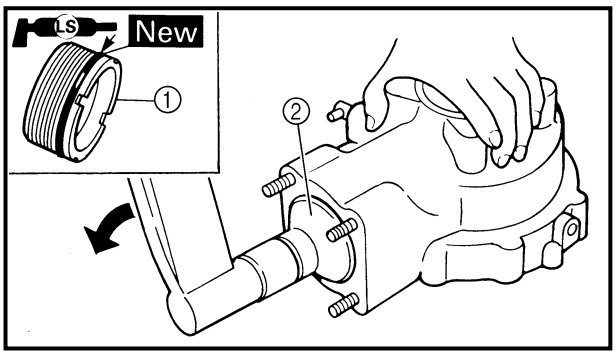


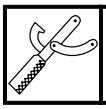
FINAL DRIVE GEAR ASSEMBLY

1.Install:
- Drive pinion gear (with shim(s) and bearing)
  (proper shim size as calculated)
- Bearing retainer (drive pinion gear) ①

100 Nm (10.0 m • kg, 72 ft • lb)

Use a bearing retainer wrench ②.

CAUTION:
- **Always use a new bearing.**
- **The final drive shaft bearing retainer has left-hand threads. Turn the retainer counterclockwise to tighten it.**

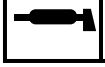


Bearing retainer wrench:
P/N. YM-04050, 90890-04050

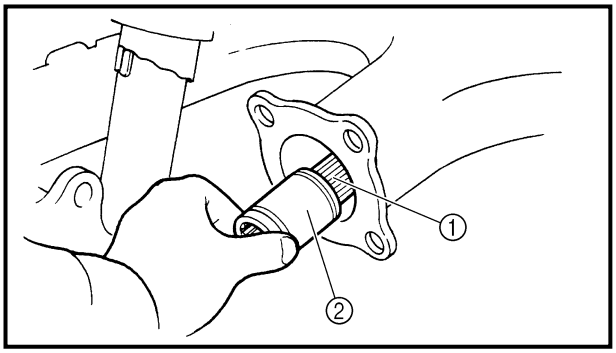
2.Adjust:
- Final gear lash
  Refer to "FINAL GEAR LASH MEASUREMENT AND ADJUSTMENT".

FINAL DRIVE GEAR INSTALLATION

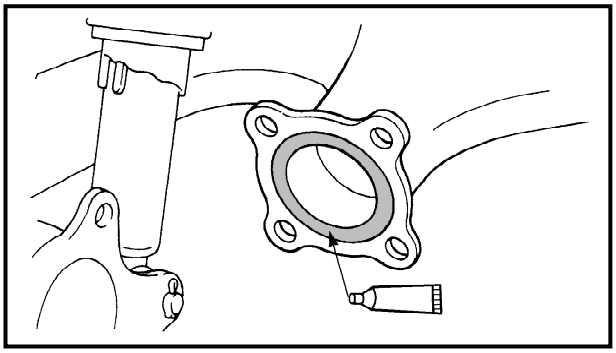
1.Lubricate:
- Drive shaft
- Coupling gear
- O-ring
- Oil seal
- Bearing



Lithium-soap base grease



2.Install:
- Drive shaft ①
- Coupling gear ②
  (to the universal joint)



3.Apply:
- Sealant (Quick Gasket®)
  (to the mating surfaces of the swingarm and the final drive gear case)

Sealant (Quick gasket®):
P/N. ACC-11001-05-01
Yamaha bond No.1215®:
P/N. 90890-85505

4.Install:
- Final drive gear
- Nuts — LT — **57 Nm (5.7 m • kg, 41 ft • lb)**
- Bolts — LT — **63 Nm (6.3 m • kg, 45 ft • lb)**