

12. Final Drive

Service Information	12-1	Final Gear Case Removal/Installation	12-3
Troubleshooting	12-1	Final Gear Case Disassembly	12-4
Driveshaft Disassembly/Assembly	12-2	Final Gear Case Assembly	12-6

Service Information

- Replace all oil seals and O-rings whenever the final drive gear assembly is disassembled.
- Check the tooth contact pattern and gear backlash when the bearing, gear set and/or gear case is replaced. (Section 15 of the Common Service Manual)

Troubleshooting

Excessive noise in final drive

- Worn or damaged ring gear and driven flange
- Damaged driven flange or wheel hub
- Worn or damaged pinion gear and/or pinion joint splines
- Excessive backlash between pinion and ring gears.
- Low oil level

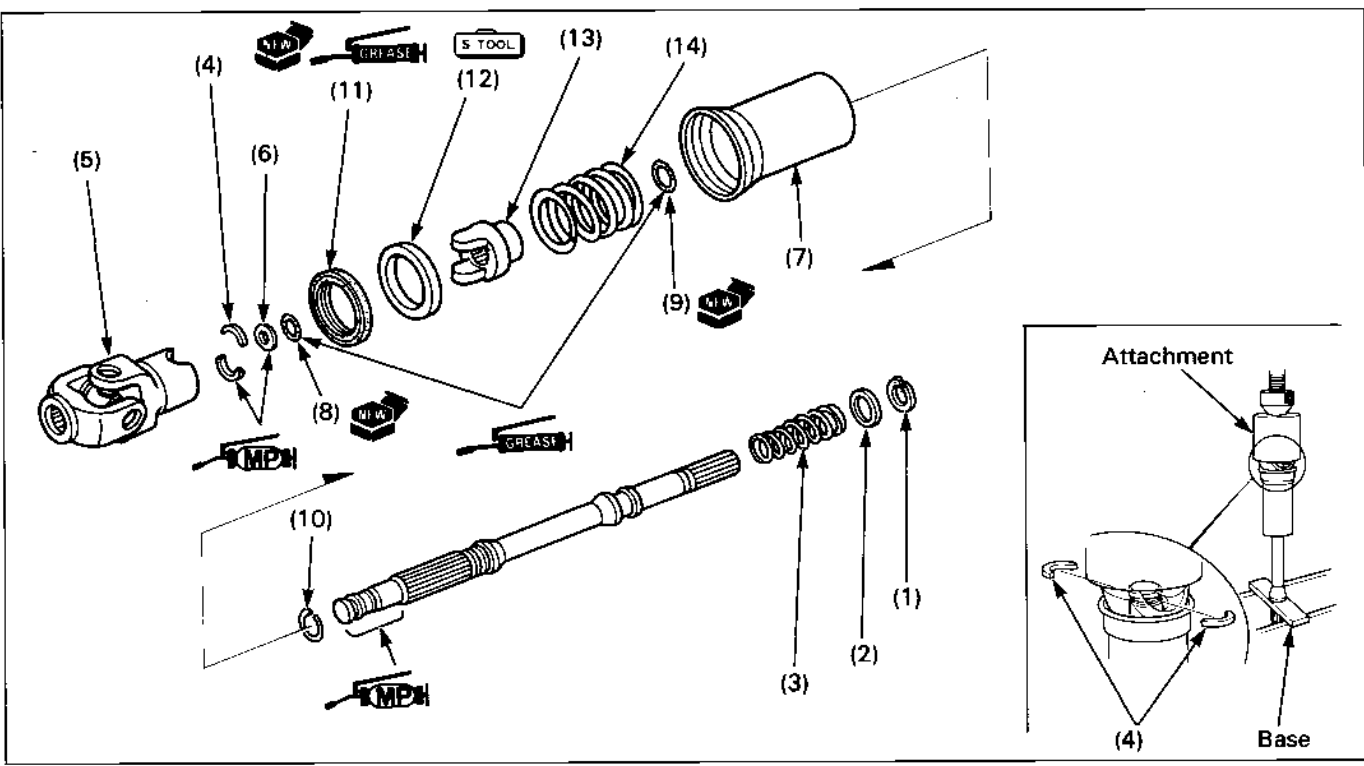
Excessive rear wheel backlash

- Worn driveshaft splines
- Excessive backlash between ring gear and pinion gear
- Worn driven flange and ring gear splines
- Excessive play in final drive case bearings
- Worn driveshaft and or pinion joint splines

Oil leaks at final gear case

- Clogged breather hole
- Oil level too high
- Faulty oil seal(s)

Driveshaft Disassembly/Assembly



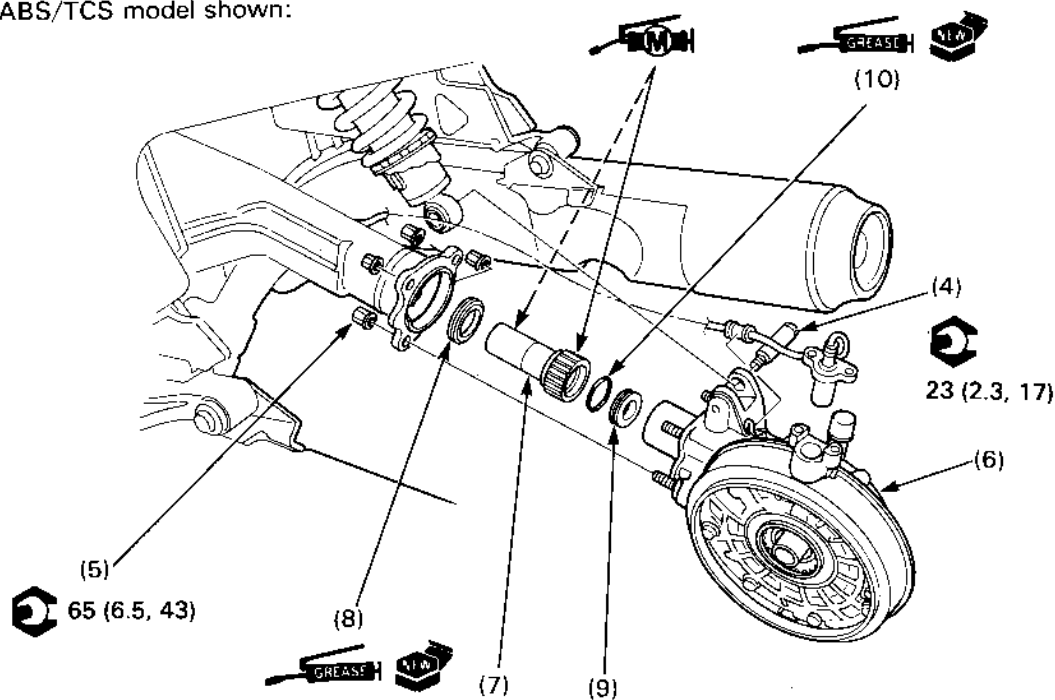
Requisite Service

- Swingarm removal/installation (page 14-8)

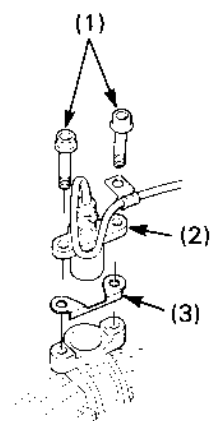
Procedure	Q'ty	Remarks
Disassembly Order		Assembly is in the reverse order of disassembly.
(1) Snap ring	1	
(2) Spring stopper	1	
(3) Driveshaft spring	1	
(4) Universal joint cotter	2	Support the driveshaft with the yoke joint compressor base (07LMF-MT30120), compress the spring with the yoke joint compressor attachment (07LMF-MT30110) using the hydraulic press and remove the cotters as shown.
(5) Universal joint	1	
(6) Thrust washer	1	
(7) Damper case	1	Fill the case with 30 cc (1.0 US oz, 1.1 Imp oz) of Hypoid gear oil (SAE # 80) after installation.
(8) 14.8 x 2.4 mm O-ring	1	
(9) 19 x 1.9 mm O-ring	1	
(10) Case stopper ring	1	
(11) Oil seal	1	Remove from the damper case.
(12) Oil seal guide	1	If necessary, remove using the bearing race remover (07946-3710500). Install using the driver (07749-0010000) and attachment, 52 x 55 mm (07746-0010400).
(13) Damper cam	1	
(14) Damper spring	1	

Final Gear Case Removal/Installation

ABS/TCS model shown:



ABS/TCS or LBS-ABS/TCS model:



NOTE

- ABS/TCS or LBS-ABS/TCS model: After installing the rear wheel, perform the wheel sensor air gap inspection (page 16-A-51 or 16-B-34).

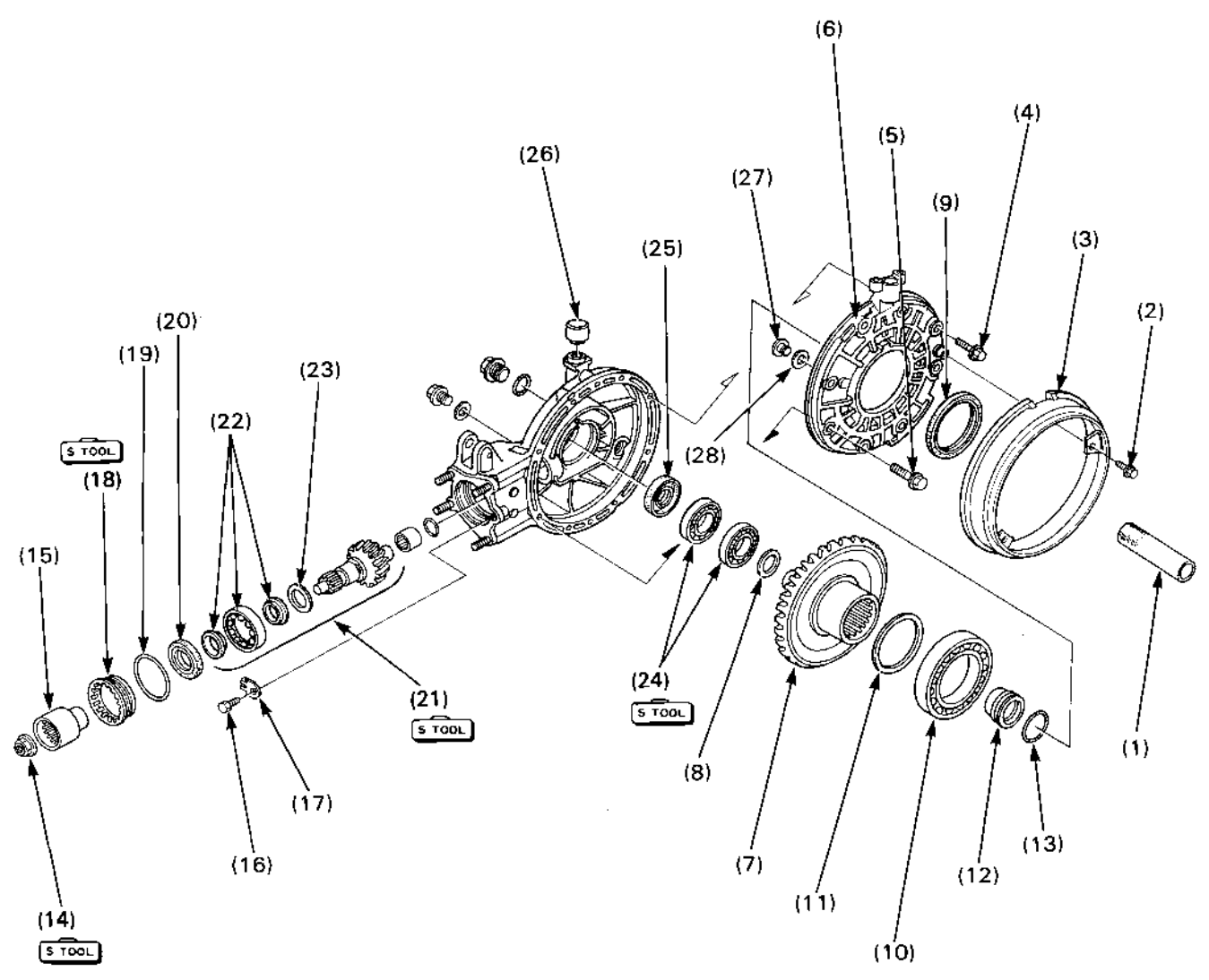
Requisite Service

- Rear wheel removal/installation (page 14-2)
- Final gear oil draining

Procedure	Q'ty	Remarks
Removal Order		Instllation is in the reverse order of removal.
(1) Wheel sensor mounting bolt	2	ABS/TCS or LBS-ABS/TCS model Remove from wire clamp.
(2) Wheel sensor	1	
(3) Sensor shim	(1)	
(4) Shock absorber lower mounting bolt	1	
(5) Final gear case mounting nut	4	Support the final gear case and remove the nuts. At installation, loosely install the nuts, install the rear wheel completely (page 14-2), then tighten the nuts.
(6) Final gear case assembly	1	At installation, apply molybdenum disulfide grease to the driveshaft joint splines and remove the grease from the one spline groove to allow air to escape from the joint.
(7) Driveshaft joint	1	Install into the final gear case being careful not to damage the oil seal lip.
(8) Oil seal	1	Remove from the driveshaft joint.
(9) Driveshaft cap	1	
(10) O-ring	1	Remove from the driveshaft cap.

Final Gear Case Disassembly

ABS/TCS model shown:



WARNING

- Always wear insulated gloves when handling a heated gear case to prevent burning your hands.

CAUTION

- Do not use a torch to heat the final gear case; it may cause warping.

NOTE

- Keep dust and dirt out of the gear case.
- Be careful not to damage the case and cover mating surfaces.
- Refer to section 15 of the Common Service Manual for the backlash inspection and the gear tooth contact pattern check. See page 1-11 for the backlash specification.

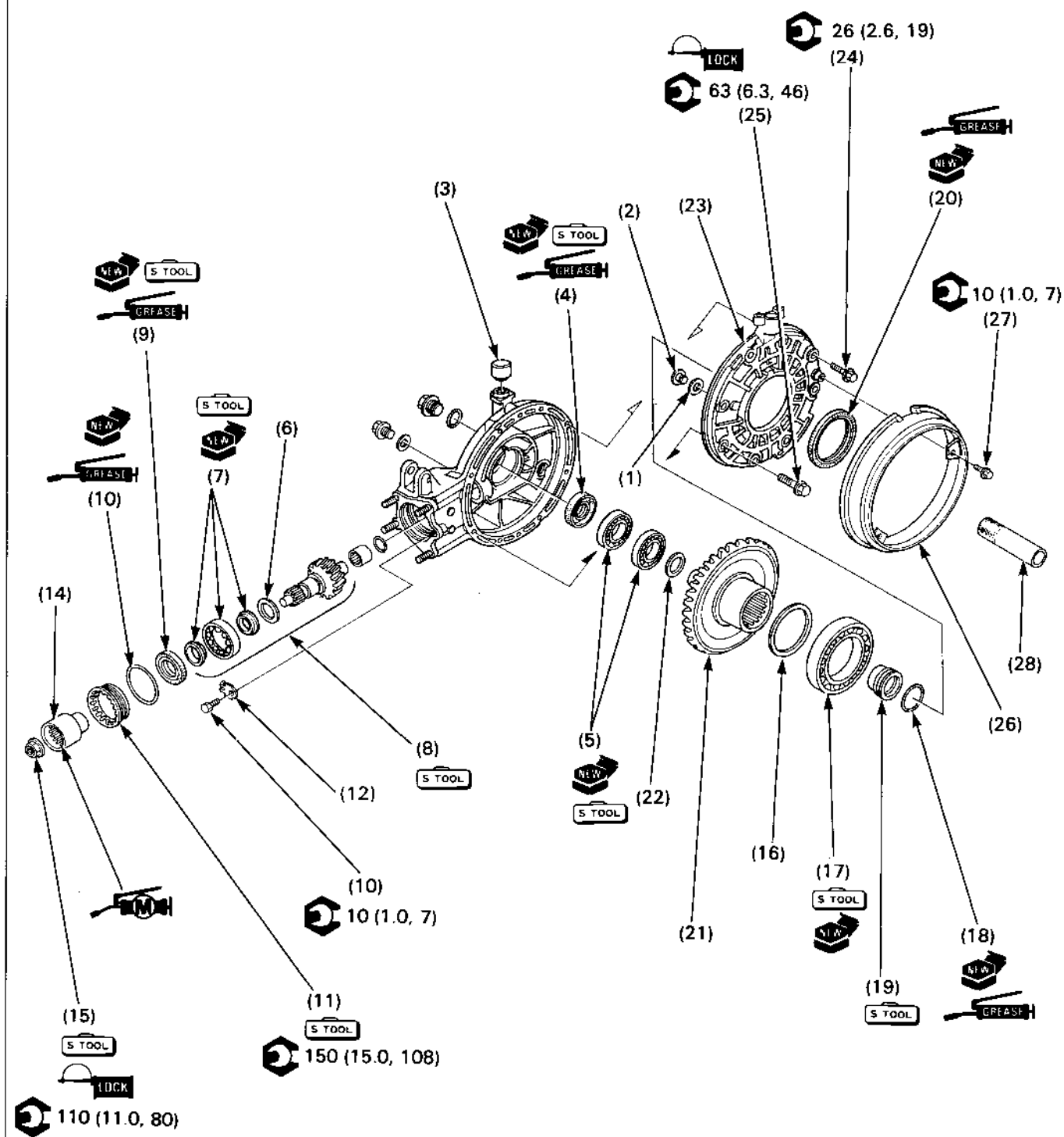
Requisite Service

- Final gear case removal (page 12-3)

Procedure		Q'ty	Remarks
Disassembly Order			
(1)	Distance collar	1	
(2)	Bolt Standard model	1	
	ABS/TCS or LBS-ABS/TCS model	3	
(3)	Dust guard plate	1	
(4)	8 mm gear cover bolt	6	
(5)	10 mm gear case cover bolt	2	
(6)	Gear case cover	1	
(7)	Ring gear	1	NOTE • If the ring gear stays in the cover, press the ring gear out of the cover.
(8)	Wave washer	1	
(9)	Oil seal	1	
(10)	Ring gear bearing	1	Pry out the bearing from the ring gear.
(11)	Ring gear shim	1	
(12)	O-ring guide	1	Remove by tapping from the opposite side.
(13)	O-ring	1	Remove from the guide.
(14)	Pinion joint nut	1	Removal (page 12-8)
(15)	Pinion joint	1	
(16)	Bolt	1	
(17)	Pinion retainer lock washer	1	
(18)	Pinion retainer	1	Removal (page 12-8)
(19)	O-ring	1	Remove from the pinion retainer.
(20)	Oil seal	1	
(21)	Pinion gear assembly	1	Removal (page 12-9)
(22)	Pinion bearing/inner race	1/2	Remove from the shaft with the bearing puller.
(23)	Pinion gear shim	1	
(24)	Final gear case bearing	2	Removal (page 12-9)
(25)	Oil seal	1	
(26)	Breather cap	1	
(27)	Ring gear stop pin	1	
(28)	Stop pin shim	1	

Final Gear Case Assembly

ABS/TCS model shown:



NOTE

- Keep dust and dirt out of the gear case.
- Be careful not to damage the case and cover mating surfaces.
- Refer to section 15 of the Common Service Manual for the backlash inspection, the gear tooth contact pattern check and the ring gear-to-stop pin clearance check.
- If the gear set, pinion gear bearing, ring gear bearing, gear case bearing and/or gear case are replaced, install a 1.50 mm pinion gear shim and a 2.00 mm ring gear shim.
- The ring gear and pinion gear must be replaced as a set.

Requisite Service

- Final gear case installation (page 12-3)

Procedure		Q'ty	Remarks
Disassembly Order			
(1)	Stop pin shim	1	Selection (page 12-10)
(2)	Ring gear stop pin	1	
(3)	Breather cap	1	Clean the breather hole and install.
(4)	Oil seal	1	Use the driver (07749-0010000) and attachment, 52 x 55 mm (07746-0010400).
(5)	Final case bearing	2	Use the driver (07749-0010000), attachment, 52 x 68 mm (07746-0010500) and pilot, 35 mm (07746-0040800).
(6)	Pinion gear shim	1	Selection (page 12-10)
(7)	Pinion bearing/outer race	1/2	Drive onto the pinion gear, using the driver, 40 mm I.D. (07746-0030100) and attachment, 25 mm I.D. (07746-0030200).
(8)	Pinion gear assembly	1	Drive into the gear case until enough threads are visible to engage the pinion retainer, using the bearing race insert attachment (07931-4630300).
(9)	Oil seal	1	Install into the pinion retainer, using the driver (07749-0010000) and attachment, 52 x 55 mm (07746-0010400).
(10)	O-ring	1	Install onto the pinion retainer.
(11)	Pinion retainer	1	Installation (page 12-8).
(12)	Pinion retainer lock washer	1	NOTE • There are two types (A or B) of lock washers.
(13)	Bolt	1	
(14)	Pinion joint	1	
(15)	Pinion joint nut	1	Installation (page 12-8)
(16)	Ring gear shim	1	Selection (page 12-11)
(17)	Ring gear bearing	1	Installation (page 12-9)
(18)	O-ring	1	Install onto the O-ring guide.
(19)	O-ring guide	1	Drive in the ring gear, using the driver (07749-0010000) and attachment, 42 x 47 mm (07746-0010300).
(20)	Oil seal	1	
(21)	Ring gear	1	
(22)	Wave washer	1	
(23)	Gear case cover	1	Clean the mating surfaces of the case and cover thoroughly, and apply liquid sealant to them.
(24)	10 mm gear case cover bolt	2	
(25)	8 mm gear case cover bolt	6	
(26)	Dust guard plate	1	
(27)	Bolt	1	Standard model
		3	ABS/TCS or LBS-ABS/TCS model
(28)	Distance collar	1	Install with the polished side toward the final gear case.

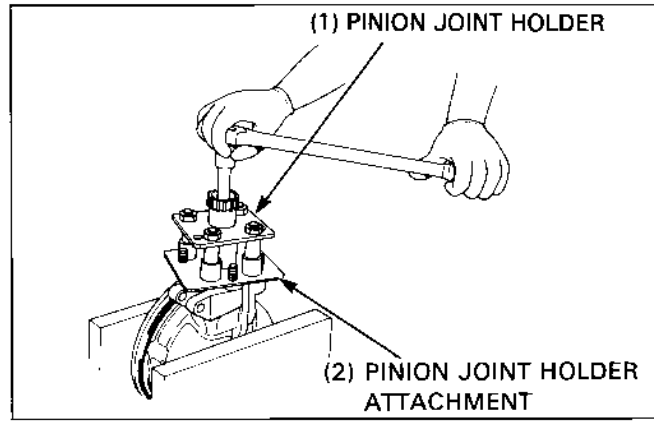
Pinion Joint Nut Removal/Installation

Removal

Install the pinion joint holder and remove the pinion joint nut.

 S TOOL

Pinion joint holder 07924—ME40000
Pinion joint holder attachment 07924—9690102



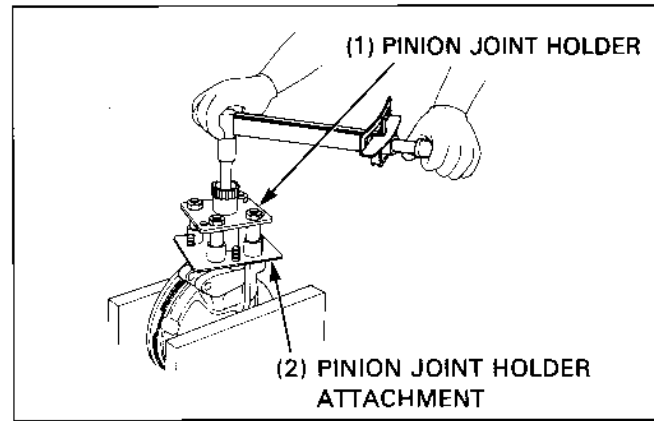
Installation

Install the pinion joint and pinion joint nut.
Install the pinion joint holder and tighten the pinion joint nut.

Torque: 110 N·m (11.0 kg-m, 80 ft-lb)

 S TOOL

Pinion joint holder 07924—ME40000
Pinion joint holder attachment 07924—9690102



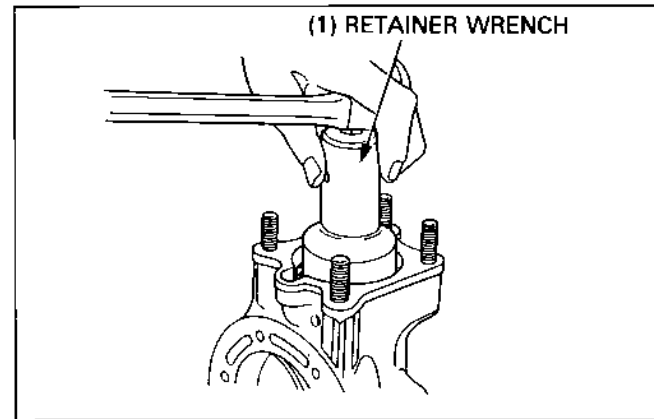
Pinion Retainer Removal/Installation

Removal

Remove the pinion retainer with the pinion retainer wrench.

 S TOOL

Pinion retainer wrench 07910—MA10100



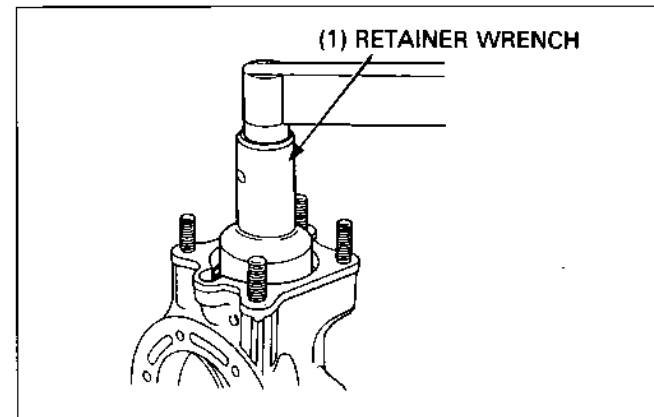
Installation

Coat the O-ring on the pinion retainer with grease or gear oil. Screw the pinion retainer in, pressing the pinion bearing in place, then tighten it with the pinion retainer wrench.

Torque: 150 N·m (15.0 kg-m, 108 ft-lb)

 S TOOL

Pinion retainer wrench 07910—MA10100



Pinion Gear Assembly Removal

Pull the pinion gear off with the pinion puller.

S TOOL

Shaft puller

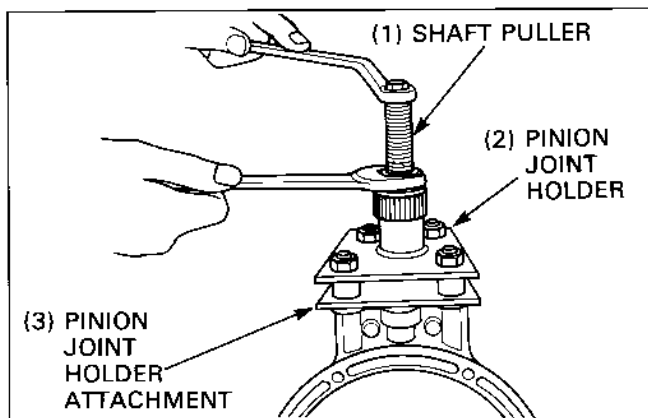
07931—ME40000 or
07931—ME4010A
(U.S.A. only)

Pinion joint holder

07924—ME40000

Pinion joint holder attachment

07924—9690102



Final Gear Case Bearing Removal

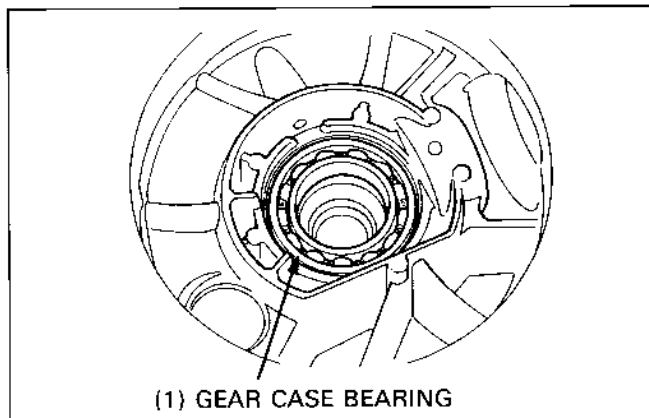
Heat the gear case to approximately 80°C (176°F)

▲ WARNING

- Always wear insulated gloves when handling the gear case after it has been heated.

CAUTION

- Do not use a torch to heat the gear case, or it may cause warping.



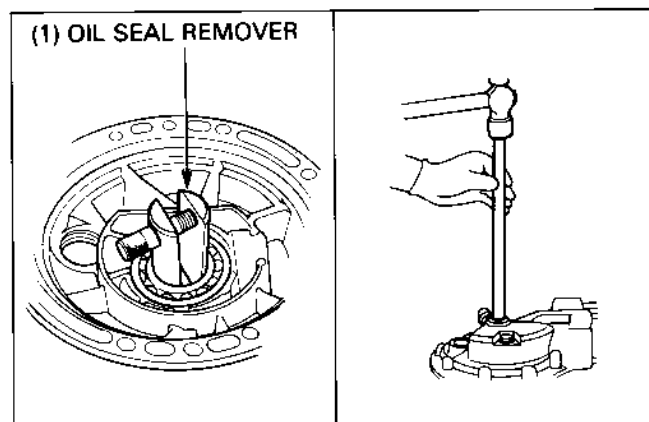
Install the oil seal remover into the gear case bearing.

S TOOL

Oil seal remover

07948—4630100

Turn the gear case over and drive the gear case bearing out.



Ring Gear Bearing Installation

If the ring gear assembly was loose against the cover:
Install the original shim onto the ring gear.

NOTE

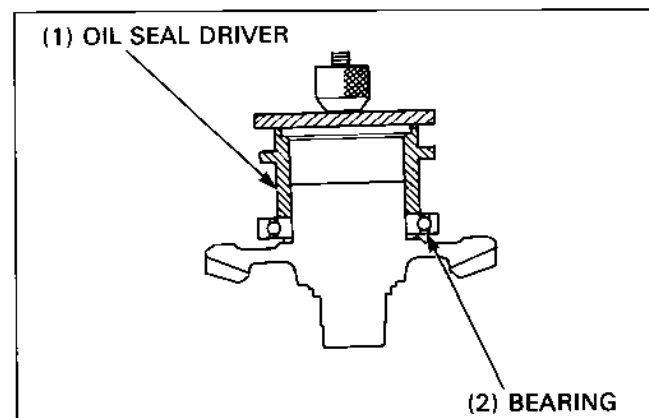
- If the gear set, pinion bearing, ring gear bearing, gear case bearing and/or gear case are replaced, install a 2.00 mm thick shim (standard).

Place a new ring gear bearing on the ring gear and drive it on with the oil seal driver.

S TOOL

Oil seal driver

07965—MC70100

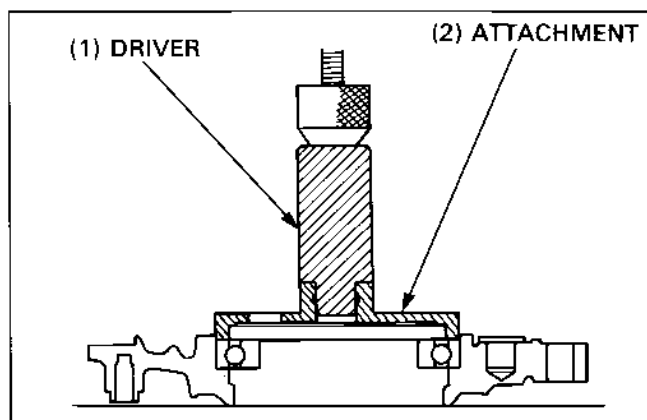


Final Drive

If the ring gear stayed in the cover:
Press the ring gear bearing into the case cover.

 S TOOL

Driver 07749—0010000
Oil seal driver attachment 07948—SB00101



Install the original shim onto the ring gear.

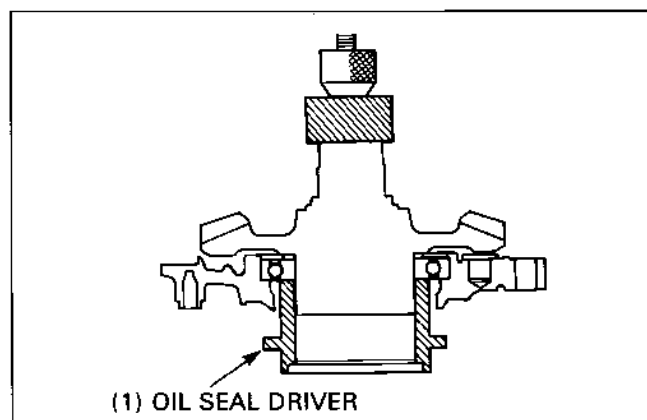
NOTE

- If the gear set, pinion bearing, ring gear bearing, gear case bearing and/or gear case are replaced, install a 2.00 mm thick shim (standard).

Support the bearing inner race with the oil seal driver attachment, and press the ring gear into the bearing with a suitable tool.

 S TOOL

Oil seal driver 07965—MC70100



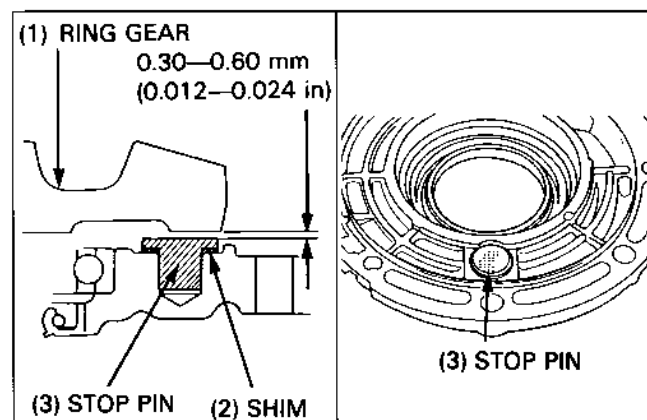
Stop Pin Shim Selection

Measure the ring gear-to-stop pin clearance (Section 5 of the Common Service Manual).

Clearance: 0.30—0.60 mm (0.012—0.024 in)

Install a stop pin shim to obtain the correct clearance.

Shim thickness: A: 0.10 mm
A: 0.15 mm



Ring Gear Shim Selection

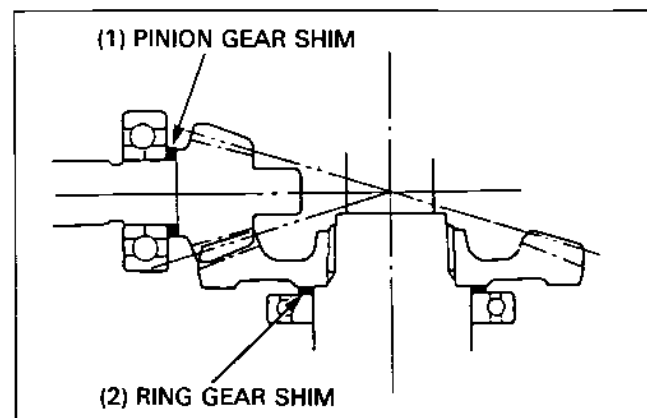
Check the tooth contact pattern (Section 5 of the Common Service Manual).

If the pattern is not correct, remove and change the pinion gear shim.

The pattern will shift about 1.5—2.0 mm (0.06—0.08 in) when the thickness of the shim is changed by 0.1 mm (0.004 in)

NOTE

- Thirteen shims (A—M) are available in thickness intervals of 0.03 mm. The thinnest is 1.32 mm and the thickest is 1.68 mm.
- The standard shim (G) thickness is 1.50 mm.



Pinion Gear Shim Selection

Check the gear backlash (Section 5 of the Common Service Manual).

Backlash: 0.05—0.15 mm (0.002—0.006 in)

If the backlash is not within the specifications, remove and change the ring gear shim.















The backlash is changed by about 0.06—0.07 mm (0.002—0.003 in) when the thickness of the shim is changed by 0.10 mm (0.004 in).

NOTE

- Seventeen shims (A—Q) are available in thickness intervals of 0.03 mm. The thinnest is 1.82 mm and the thickest is 2.30 mm.
- The standard shim (G) thickness is 2.00 mm.

Symbols

The symbols used throughout this manual show specific service procedures. If supplementary information is required pertaining to these symbols, it would be explained specifically in the text without the use of the symbols.

	<p>Replace the part(s) with new one(s) before assembly.</p>
	<p>Use special tool</p>
	<p>Use optional tool. Use the same procedure you use to order parts.</p>
 <p>10 (1.0, 7.2)</p>	<p>Torque specification. 10 N·m (1.0 kg-m, 7.2 ft-lb)</p>
	<p>Use recommended engine oil, unless otherwise specified.</p>
	<p>Use molybdenum oil solution (mixture of the engine oil and molybdenum grease in a ratio of 1 : 1).</p>
	<p>Use multi-purpose grease (Lithium based multi-purpose grease NLGI #2 or equivalent)</p>
	<p>Use molybdenum disulfide grease (containing more than 3% molybdenum disulfide, NLGI #2 or equivalent) Example: Molykote® BR-2 plus manufactured by Dow Corning, U.S.A. Multi-purpose M-2 manufactured by Mitsubishi Oil Japan</p>
	<p>Use molybdenum disulfide paste (containing more than 40% molybdenum disulfide, NLGI #2 or equivalent) Example: Molykote® G-n Paste manufactured by Dow Corning, U.S.A. Honda Moly 60 (U.S.A. only) Rocol ASP manufactured by Rocol Limited, U.K. Rocol Paste manufactured by Sumico Lubricant, Japan</p>
	<p>Use silicone grease</p>
	<p>Apply a locking agent. Use a middle strength locking agent unless otherwise specified.</p>
	<p>Apply sealant</p>
	<p>Use brake fluid, DOT 3 or DOT 4. Use the recommended brake fluid, unless otherwise specified.</p>
	<p>Use Fork or Suspension Fluid.</p>