

1968-74 TOYOTA

Toyota, All Models

DESCRIPTION

The axle assembly is hypoid gear type with a separate carrier housing. It comes in slightly different models for use in all Toyota vehicles. Two-pinion differential cases are one-piece design while four-pinion cases are two-piece design. The differential side bearing preload is set with adjusting nuts on all models. The pinion bearing preload can be set with a solid spacer and adjusting shim or with a collapsible spacer.

AXLE RATIO & IDENTIFICATION

Toyota uses only one basic type of axle assembly. Any differences in Removal & Installation or Overhaul procedures will be noted where they occur. To determine axle ratio, divide number of ring gear teeth by number of pinion gear teeth.

REMOVAL & INSTALLATION

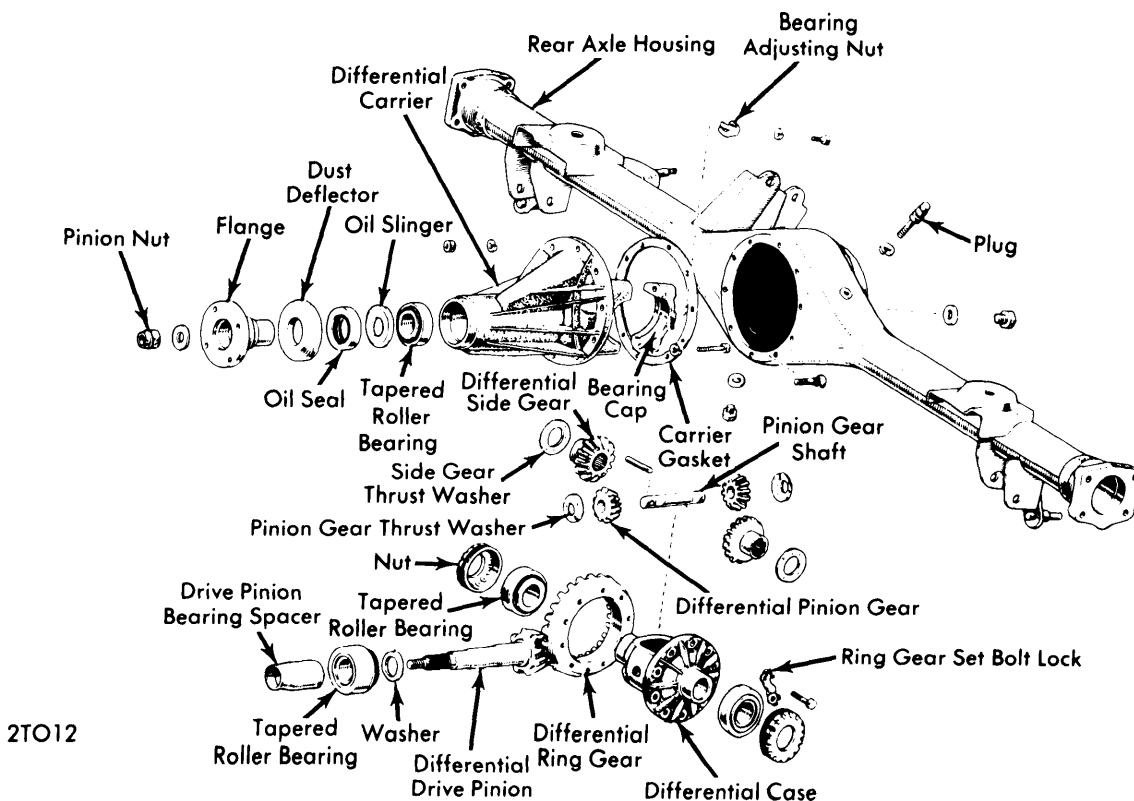
AXLE SHAFTS & BEARINGS

Axle Shaft Removal, Exc. Pickup & Crown St. Wgn. – Working through hole in axle flange, remove bolts holding bearing retainer to axle housing flange. Using slide hammer,

remove shaft from housing using care not to damage axle seal. If both axles are to be removed, be sure to index mark for reinstallation in original position. If axle housing seal is being replaced, coat sealing lip with grease before installation.

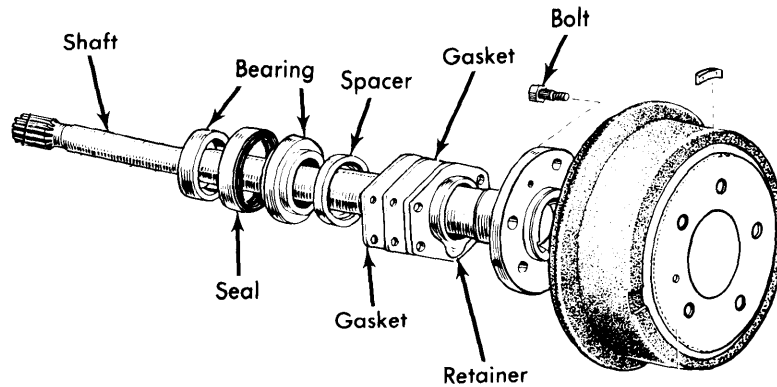
Axle Shaft Removal, Pickup & Crown St. Wgn. – Raise and suitably support vehicle. Remove brake drum after first removing the mounting bolts. Disassemble brake components and plug open brake fluid passages. Disconnect and place out-of-way, parking brake linkage. Remove the four nuts mounting brake plate-to-rear axle housing. Carefully maneuver axle shaft from vehicle making sure not to damage oil seal in housing.

Bearing Removal & Installation, Exc. Pickup & Crown St. Wgn. – To remove bearing, grind part way through bearing retainer ring being careful not to nick axle shaft. Cut through remaining portion of retainer with cold chisel. Remove split retaining ring and press bearing off shaft. Remove spacer from shaft. To install, place spacer and bearing onto shaft and press into place. Heat new retaining ring to 284-320°F (140-160°C) and press into place. *NOTE* – The retaining ring will show a faint yellow color when heated to proper temperature, do not heat above this point. Measure thickness of brake back plate. Using chart below, select proper thickness of selective fit gasket and install between backing plate and axle housing flange.



**DIFFERENTIAL ASSEMBLY – TWO-PINION DESIGN
(1971-72 CROWN SHOWN)**

1968-74 TOYOTA (Cont.)



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REAR AXLE ASSEMBLY (COROLLA, CORONA, CROWN SHOWN)

Select Fit Gaskets

| Backing Plate Thickness In. (mm) | Gasket Thickness In. (mm) |
|-------------------------------------|------------------------------|
| .105-.109 (2.66-2.78) | .012 (.03) |
| .100-.105 (2.54-2.66) | .020 (.05) |
| .095-.100 (2.42-2.54) | .024 (.06) |

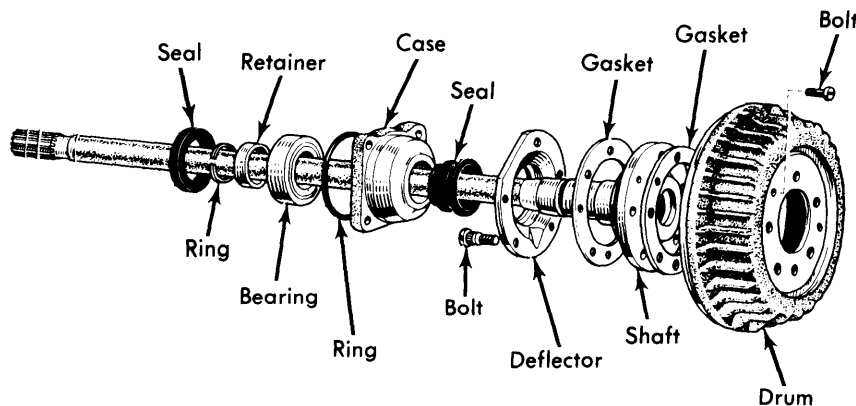
Place selective fit gasket into position. Place other gasket onto axle shaft so that when shaft is installed it will be between bearing retainer plate and brake backing plate. Install axle shaft check alignment of gaskets and install bolts. Except for selective fit gasket, there is no bearing adjustment.

Bearing Removal & Installation, Pickup & Crown St. Wgn. — Remove snap ring holding bearing retainer. Install suitable puller onto rear axle bearing case and tighten nuts. Press rear axle shaft out of bearing case. Remove axle shaft

bearing from case. After indexing bearing case and brake backing plate, drive out serrated bolts and separate assemblies. To reassemble proceed as follows: Drive axle shaft into housing. Fit brake backing plate on bearing case with index marks aligned. Press serrated bolts into position and install oil seal into bearing case. Fit axle shaft bearing into case. Slide on retainer and fit snap ring. Position new O-ring on axle housing, then refit axle shaft assembly with backing plate and tighten nuts. Install remaining components in reverse order of removal.

PINION SEAL REPLACEMENT

Corona MX Mk II, 1974 Corona & 1972 Crown - 1) Disconnect and remove propeller shaft, then set parking brake. Measure and record total pinion preload with pull scale attached by thin cord to small pinion flange nut. The measurement is made within small movement caused by ring gear and axle shaft splines backlash; axle shafts are locked by parking brake.

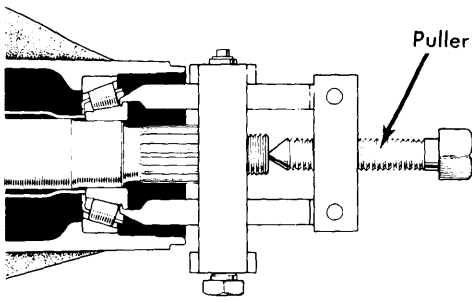


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REAR AXLE ASSEMBLY (PICKUP SHOWN)

Drive Axles

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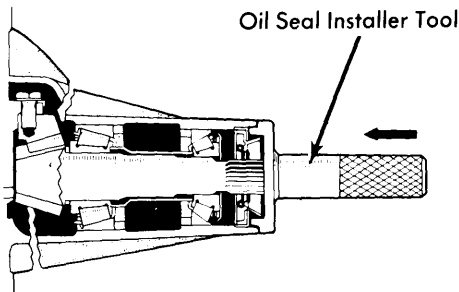
REMOVING FRONT BEARING (CORONA SHOWN)

2) Remove pinion shaft nut calking, then remove nut. Using suitable flange puller tool (09557-22010), remove pinion flange. Remove oil seal using suitable puller, then take out oil slinger. Install bearing puller and remove bearing, then withdraw spacer and measure. If spacer is larger than minimum specification, it may be reused by adding an additional shim. If spacer is shorter, use new spacer. Assemble spacer and shim (if used) onto pinion shaft.

Spacer Length

| Application | Specification In. (mm) |
|----------------------|---------------------------|
| Corona MX Mk II..... | 2.40 (61.0) |
| Corona (1974) | |
| 6.7" Ring Gear | 2.13 (54.0) |
| 7.1" Ring Gear | 2.40 (61.0) |
| Crown (1972)..... | 2.10 (54.0) |

3) Install bearing oil slinger. Apply grease to seal lip and install in carrier. On MX Mk II models, fit oil seal .02" (.4 mm) from edge of carrier bore. Using tool attached to pinion flange, install pinion flange. Remove tool, install a new nut and tighten. Rotate pinion in both directions to seat bearing, then measure preload in same manor as before. Preload must be equal to original value plus 1.5-2.0 lbs. (.7-.9 kg). If preload is insufficient, tighten nut in 7.2 ft. lbs. (.97 mkg) increments until it is to specifications. If 145 ft. lbs. (20.0 mkg) is reached without preload being within specification, loosen nut and begin retightening again.



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INSTALLING OIL SEAL (CORONA SHOWN)

NOTE — On all other models, carrier removal is suggested before replacing pinion seal.

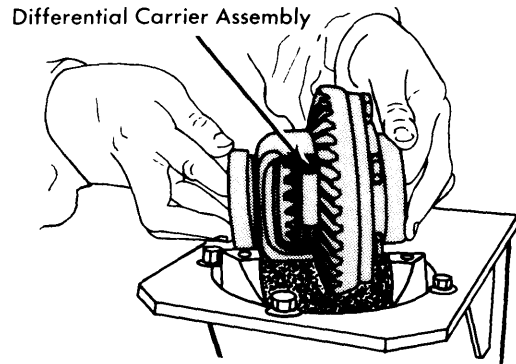
DIFFERENTIAL CARRIER REMOVAL & INSTALLATION

Drain oil from axle housing. Loosen hub nuts, and remove wheels. Disconnect and place out-of-way propeller shaft. Remove axle shafts as previously described. **NOTE** — Take care not to damage oil seal if it isn't scheduled for replacement. Loosen bolts and remove differential carrier. To install, reverse removal procedure noting the following: Coat both sides of carrier-to-housing gasket with sealer before installation. Fill axle housing with 90W gear oil.

OVERHAUL

DISASSEMBLY

1) Mount carrier on suitable work stand. Punch aligning marks on bearing cap and carrier to prevent intermixing of left and right caps. Remove adjusting nut lock bolt. Remove side bearing bolts, caps, and adjusting nuts. Take out differential case assembly with bearing cups. Note number and thickness of any shims. Remove pinion flange bolt using suitable tool to hold the flange. On some models, drive pinion will fall out if not restrained.



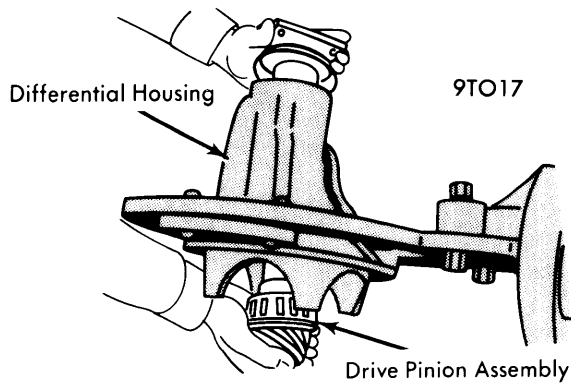
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REMOVING DIFFERENTIAL CASE

2) Using suitable puller (09557-22010), remove flange from pinion shaft. On pickup models, puller is not required. Using suitable puller, remove oil seal. On pickup models, seal can be pried out in lieu of special tool. Withdraw oil slinger.

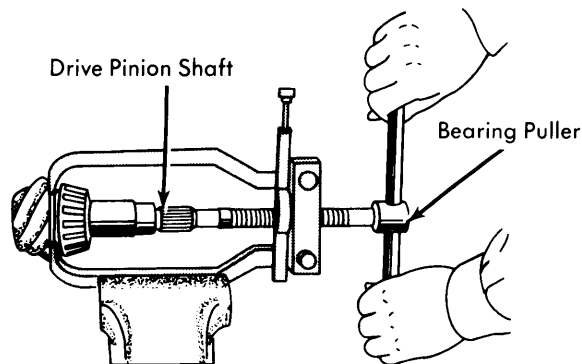
3) With suitable puller, remove front pinion bearing, then press drive pinion out of rear of carrier. On pickup models, drive pinion removal does not require a press. Press out front and rear bearing cups. With drive pinion shaft installed in suitable press, remove rear bearing. Use caution to avoid deforming shim that adjusts pinion depth (height). Remove side bearings from differential case. **NOTE** — Cutaways are

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REMOVING DRIVE PINION & FLANGE (PICKUP SHOWN)

provided in case for clearance of puller hooks. Straighten out lock plates on ring gear bolts, index mark ring gear and case, then remove bolts.



REMOVING REAR BEARING

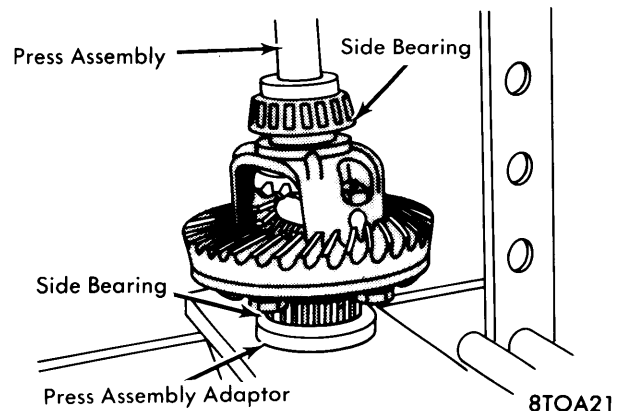
4) Mount differential case and ring gear assembly in vise so ring gear teeth are pointed down, then tap ring gear from case with brass hammer. Measure backlash between differential pinion and side gear for reference during reassembly; backlash should be .001-.006" (.02-.15 mm) 1968-69 Corolla or .002-.008" (.05-.20 mm) all others. Using a punch, remove pinion gear shaft retaining pin from differential case, then remove case cover. Push out pinion shaft, then remove side pinion gears and thrust washers. On four-pinion design, separate case cover and remove pinion gear shaft, shaft holder and thrust washers.

REASSEMBLY & ADJUSTMENT

Case Assembly – 1) Lubricate all components with hypoid gear lubricant. On two-pinion models, assemble side gears and pinion gears into differential case. Make sure oil groove, if present, on side gear thrust washer faces toward gear. On four-pinion types, install side gears, thrust washers, differential pinions, pinion shaft holder, differential shaft, and pinion

shaft. On Carina & Celica models, align index marks, install differential case cover and tighten bolts. Note that long bolt(s) serve to lock differential tight.

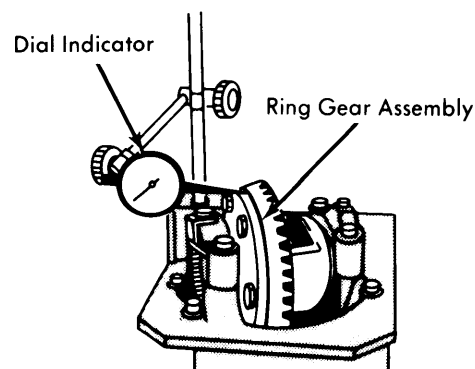
2) Check backlash between side gears and pinion gears. If backlash is not .001-.006" (.02-.15 mm) for 1968-69 Corolla or .002-.008" (.05-.20 mm) all others, install suitable selective fit thrust washers. Install pinion shaft lock pin, if equipped, and peen over hole.



INSTALLING SIDE BEARINGS

3) Press differential side bearings onto differential case. On early models, fit ring gear on differential case and tighten bolts alternately; bend over lock tabs. On late models, heat ring gear in oil or water bath to approximately 212°F (100°C), then quickly wipe off gear and install on differential case. Fit bolts, tighten alternately and evenly, then bend over lock tabs. Install differential case assembly on differential carrier and measure ring gear runnout.

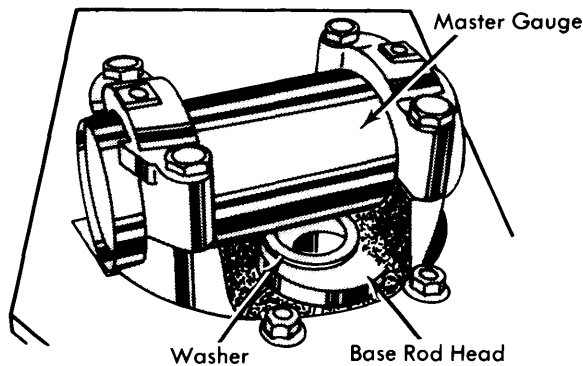
4) If runnout is within specifications, remove differential carrier and bend up on ring gear lock plate. If runnout exceeds specifications, remount ring gear 180° on differential case. If that fails to bring ring gear into specifications, remove ring gear from case and examine runnout. If case runnout is within range specified for ring gear, then ring gear is at fault and must be replaced. Remove ring gear and case assembly from carrier.



MEASURING RING GEAR RUNNOUT

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Drive Pinion Depth — Install drive pinion cups into the carrier. Adjust pinion depth using Toyota Master Gauge or equivalent. Insert drive pinion rear bearing onto suitable base rod, then install base rod head. Insert this assembly into carrier from the rear. Install front pinion bearing into carrier from front end. Install collar, preload flange pulley and nut onto front end of base rod. Using a spring scale and thin cord, measure preload of drive pinion bearings. Tighten nut until preload is within specifications (see specifications). Install master gauge into differential side bearing bores, then install bearing caps and tighten. Select a shim that will just fit between master gauge and base rod head. One shim or none must be used: do not use more. After selecting the shim, remove all components of master gauge kit from carrier. Install shim onto drive pinion, if it has a chamfered edge, install that edge toward pinion gear; press rear bearing into place.



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TOYOTA MASTER GAUGE

NON-COLLAPSIBLE (SOLID) SPACER

Pinion Bearing Preload — Install bearing spacer onto pinion shaft and insert assembly into carrier from rear. Insert shims (if any) that were removed during disassembly onto pinion shaft. Install front bearing, oil deflector, flange, washer and nut. Torque pinion flange nut to specifications. Install preload flange onto pinion flange. Using a spring scale and thin cord, measure pinion bearing preload. If not to specifications, shims in front of preload spacer must be changed. If preload is too great, increase shim thickness; if preload is too small, decrease shim thickness. Use either two shims or none for adjustment. If thicker shim pack is needed, use thicker shims, not more shims. When preload is correct, remove flange, install oil seal and reassemble.

COLLAPSIBLE SPACER

Pinion Bearing Preload — Measure used spacer, if less than specifications, discard and use new spacer. If old spacer is longer than minimum specifications, it may be reused with a shim .012" (.03 mm) thick. Fit spacer on drive pinion shaft and insert assembly into carrier from rear. If shim is to be used, install it on shaft. Insert bearing into front end of carrier. Insert oil slinger and install oil seal. On MX Mk II only, ensure oil seal

is installed .04" (1 mm) from front edge of carrier bore. Apply grease to oil seal lip before installation. Using suitable pinion flange installing tool (09557-22010), fit pinion flange. Turn nut on special tool to seat pinion flange, then remove tool. Install washer and new nut and tighten to approximately 80 ft. lbs. (11.0 mkg). Install preload flange and measure preload with spring scale and thin cord. If preload is less than specifications, tighten pinion flange nut more and recheck. If preload exceeds maximum specifications, disassemble and add shims. Reassemble and recheck.

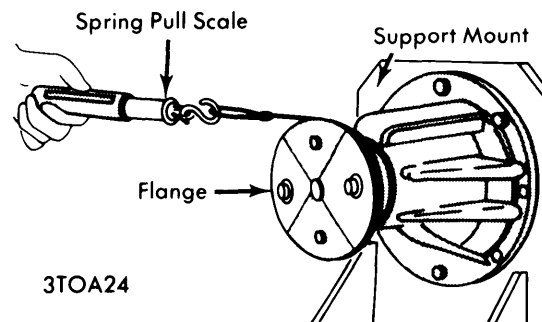
Spacer Length

| Application | Specification In. (mm) |
|----------------------|---------------------------|
| Corona MX Mk II..... | 2.40 (61.0) |
| Corona (1974) | |
| 6.7" Ring Gear..... | 2.13 (54.0) |
| 7.1" Ring Gear..... | 2.40 (61.0) |
| Crown (1972)..... | 2.10 (54.0) |

Backlash & Side Bearing Play — 1) Assemble bearings in cups and install onto carrier. Install differential assembly into carrier, then fit adjusting nuts. Put bearing caps on in original position. Tighten bolts carefully, while checking that adjusting nuts are aligned in bearing bore threads. Install dial gauge so plunger touches flange side of ring gear. Tighten flange side adjusting nut until a slight backlash remains. During operation, rotate ring gear through several revolutions to seat side bearings. Tighten tooth side nut just to the point where there is no differential end play when measured with dial indicator. At this point tighten tooth side nut additional specified number of notches to preload side bearings.

Side Bearing Preload

| Application | Specification |
|--|---------------|
| Carina, Celica, Corona, Corolla..... | 1-1.5 Notches |
| Pickup, Corona Mk II, Corona MX Mk II, Crown..... | 1.5-2 Notches |



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SIDE BEARING PRELOAD MEASUREMENT

1968-74 TOYOTA (Cont.)

2) Confirm that some backlash is still present. Install the preload flange onto the pinion shaft flange and measure preload. If within specifications go on to next step; if not, tighten tooth side adjusting nut one more notch and recheck.

Bearing Preload

| Application | ①New Lbs. (kg) | ①Used Lbs. (kg) |
|-------------------------|------------------------------|----------------------------|
| Carina & Celica..... | 5.7-8.0..... (2.4-4.6) | 1.3-3.0..... (.8-2.1) |
| Corolla | | |
| 1968-70..... | 3.5-6.6..... (1.6-3.0) | 1.3-4.2..... (.6-1.9) |
| 1974 W/8RC..... | 3.6-6.6..... (1.6-3.0) | 1.3-4.2..... (.6-1.9) |
| 1974 W/18RC..... | 5.3-8.8..... (2.4-4.0) | 1.3-3.8..... (.6-1.7) |
| Corona | | |
| 1968-69..... | 4.0-6.6..... (1.8-3.0) | .88-3.1..... (.4-1.4) |
| 1970-73..... | 4.4-6.2..... (2.0-2.8) | 4-1.2..... (.9-2.6) |
| 1974 6.7" Ring Gear ... | ②14-23.4..... (15-27) | ②3.6-11.3..... (4.2-9) |
| 1974 7.1" Ring Gear ... | ②17.4-24.3..... (20-28) | ②4.3-11.3..... (5-13) |
| Corona Mk II | | |
| W/8RC..... | 4.4-6.1..... (2.0-2.8) | .9-2.6..... (.4-1.2) |
| W/18RC..... | 7.0-9.7..... (3.2-4.4) | .9-2.6..... (.4-1.2) |
| Corona MX Mk II..... | 8.8-10.3..... (4.0-5.6) | 1.9-5.3..... (.9-2.9) |
| Crown | | |
| 1969-70..... | 4.8-7.7..... (2.2-3.5) | 1.8-5.3..... (.8-2.4) |
| 1971-72..... | 17.2-24.5..... (7.8-11.2) | 3.7-7.9..... (1.6-3.6) |
| Pickup..... | 9.7-14..... (4.4-6.4) | 3.5-10.6..... (1.6-4.8) |

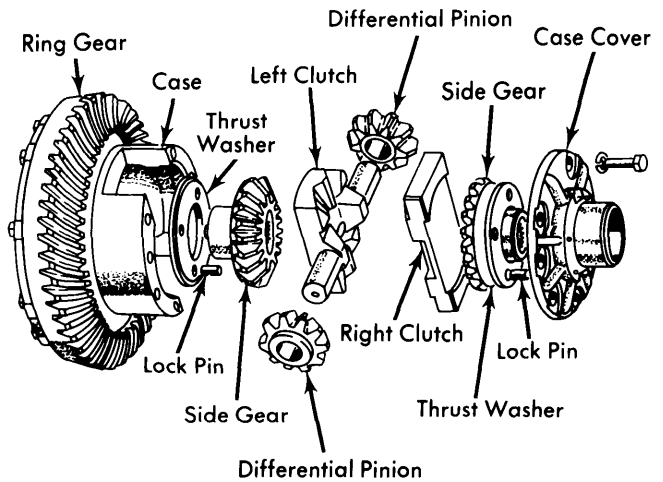
① - Using pull scale and thin cord.

② - Measured with an Inch pound torque wrench.

3) Install dial gauge so that plunger is perpendicular to ring gear tooth. Measure ring gear backlash. If not within specifications, turn left and right adjusting nuts to shift differential assembly in proper direction. If left side is loosened one notch, the right side must be tightened one notch to maintain side bearing preload. Continue procedure until backlash is within specifications. One notch will change backlash .002" (.06 mm). Tighten side bearing cap bolts. Check gear tooth contact pattern. See *Gear Tooth Contact Pattern* at beginning of this section. Install differential carrier.

LIMITED SLIP DIFFERENTIAL

Disassembly - Remove case cover and take out side gear, side gear thrust washer, lock pin, left and right clutch and differential pinion.

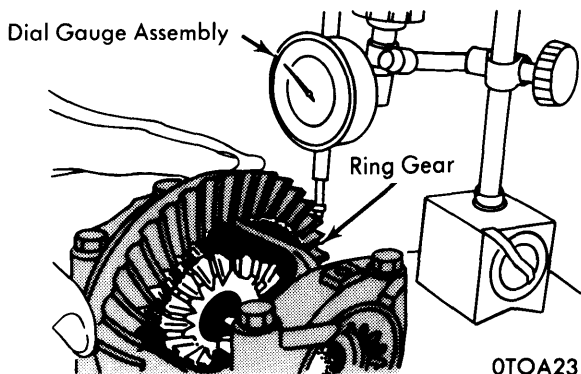


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LIMITED SLIP DIFFERENTIAL

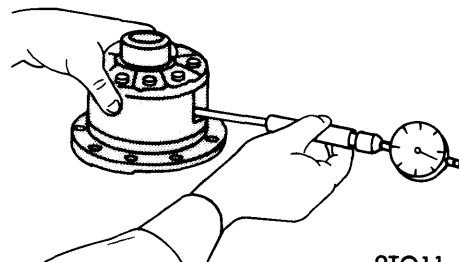
Inspection - Visually inspect all components for excessive wear or damage, then replace those parts found defective.

Reassembly & Adjustment - 1) Fit ring gear to differential case and check runout. Dial gauge reading should be .004" (.10 mm); correct, if necessary, as previously indicated.



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MEASURING BACKLASH



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MEASURING MOUNTING DISTANCE

Drive Axles

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2) Adjust clearance between differential case, side gear and clutch using thrust washers that will provide a clearance of .001-.004" (.03-.11 mm). Proceed as follows to select proper thrust washer:

3) Install case cover and tighten bolts. Check differential case mounting distance as shown in illustration, then record value. With side gear and clutches mounted in suitable vise measure distance between outside edges of side gears; use a micrometer. The difference between the two recorded figures indicates necessary thrust washer thickness. To complete reassembly, reverse removal procedure.

TIGHTENING SPECIFICATIONS

| Application | Ft. Lbs. (mkg) |
|--|---------------------|
| Pinion Nut | |
| Celica & Carina | 133-145 (18.4-20.0) |
| Corolla | |
| 1968-70..... | 95-110 (13.1-15.2) |
| 1971-74 W/18RC | 123-145 (17.0-20.0) |
| 1971-74 W/8RC | 95-108 (13.1-14.9) |
| Corona | |
| 1968-69..... | 123-130 (17.0-18.0) |
| 1970-73..... | 123-145 (17.0-20.0) |
| 1974..... | 80-145 (11.0-20.0) |
| Corona Mk II | 123-145 (17.0-20.0) |
| Corona MX Mk II | 80-145 (11.0-20.0) |
| Crown | |
| 1969-70..... | 117-145 (16.2-20.0) |
| 1971-72..... | 80-145 (11.0-20.0) |
| Pickup..... | 120-152 (16.6-21.0) |
| Bearing Cap Bolts | |
| Carina & Celica | 36-51 (5.0-7.1) |
| Corolla | 40-47 (5.5-6.5) |
| Corona | |
| 1970-73..... | 36-50 (5.0-6.9) |
| 1974..... | 50-65 (6.9-9.0) |
| Corona Mk II | |
| Coupe & Sedan | 36-50 (5.0-6.9) |
| Station Wagon | 50-68 (6.9-9.4) |
| Corona MX Mk II | 51-65 (7.1-9.0) |
| Crown | 50-70 (6.9-9.7) |
| Pickup..... | 51-65 (7.1-9.0) |
| Differential Case-to-Ring Gear | |
| Carina, Celica & Corona Mk II..... | 51-58 (7.1-8.0) |
| Corolla | 45-55 (6.2-7.6) |
| Corona MX Mk II, Crown, Pickup & Corona (1974)..... | 67-76 (9.2-10.5) |
| Corona (1968-73)..... | 50-60 (6.9-8.3) |
| Differential Carrier-to-Rear Axle Housing | |
| Crown | 15-22 (2.1-3.5) |
| Pickup..... | 15-22 (2.1-3.0) |
| All Others | 18-28 (2.5-3.9) |
| Backing Plate & Bearing Outer | |
| Retainer-to-Rear Axle Housing | |
| Corona MX Mk II | 43-52 (6.0-7.2) |
| Pickup..... | 43-58 (6.0-8.0) |
| All Others | 29-36 (4.0-.0) |
| Differential Case Cover-to-Differential Case | |
| Corolla & Corona | 18-25 (2.5-3.5) |
| Corona Mk II, Carina & Celica..... | 20-25 (2.8-3.5) |

AXLE ASSEMBLY SPECIFICATIONS

| Application | ① New Lbs. (kg) | ① Used Lbs. (kg) |
|-------------------------------------|----------------------------|----------------------------|
| Drive Pinion Bearing Preload | | |
| Carina & Celica | .8-6.2 (2.0-2.8)..... | .9-2.6 (.4-1.2)..... |
| Corolla | | |
| 1968-70..... | 2.7-4.8 (1.3-2.3)..... | .9-2.8 (.5-1.3)..... |
| 1971-74 W/8RC | 2.6-4.9 (1.2-2.2)..... | .8-2.9 (.4-1.3)..... |
| 1971-74 W/18RC | 4.4-7.0 (2.0-3.2)..... | .8-2.9 (.4-1.3)..... |
| Corona | | |
| 1968-69..... | 4.8-8.4 (2.2-3.8)..... | 1.8-5.3 (.8-2.4)..... |
| 1970-73..... | 5.3-8.8 (2.4-4.0)..... | .6-1.6 (1.3-3.5)..... |
| 1974 6.7" Ring Gear. ②..... | 10.4-19.1 (12-22)..... | ②2.3-8.7 (2.7-8.7)..... |
| 1974 7.1" Ring Gear. ②..... | 13.9-19.1 (16-22)..... | ②3.0-8.7 (3.5-10)..... |
| Corona Mk II | | |
| W/8RC | 5.2-8.8 (2.4-4.0)..... | 1.3-3.5 (.6-1.6)..... |
| W/18RC | 7.9-11.4 (3.6-5.2)..... | 1.3-3.5 (.6-1.6)..... |
| Corona MX Mk II | 7.0-9.2 (3.2-4.4)..... | 1.4-4.4 (.7-2.0)..... |
| Crown | | |
| 1969-70..... | 4-6.6 (1.8-3.0)..... | .89-3.1 (.4-1.4)..... |
| 1971-72..... | 8.2-11.5 (3.8-5.2)..... | 1.9-5.3 (.84-2.4)..... |
| Pickup..... | 8-11 (3.6-5.2)..... | 2.2-6.6 (1.0-3.0)..... |

① — Using pull scale and thin cord.

② — Measured with Inch pound torque wrench.

| Application | Specifications In. (mm) |
|---|----------------------------|
| Side Gear-to-Pinion Gear Clearance | |
| 1968-69 Corolla | .001-.006 (.03-.15) |
| All Others | .002-.008 (.05-.20) |
| Drive Pinion-to-Ring Gear Backlash | |
| Carina & Celica | .005-.007 (.13-.18) |
| Corolla | |
| 1968-70..... | .004-.006 (10-.15) |
| 1971-74 W/KC | .004-.006 (10-.15) |
| 1971-74 W/TC | .005-.007 (.13-.18) |
| Corona | .005-.007 (.13-.18) |
| Corona Mk II & MX Mk II | .005-.007 (.13-.18) |
| Crown | .005-.007 (.13-.18) |
| Pickup | |
| 1969 to Early 1972 | .006-.008 (.15-.20) |
| Late 1972 to 1974 | .005-.007 (.10-.18) |
| Ring Gear Runout | |
| Corona MX Mk II | .003 (.07) |
| Pickup (1969-72) | .004 (.10) |
| All Others | .002 (.05) |