

DATSUN/NISSAN INTEGRAL HOUSING

280ZX & Maxima Sedan (Rear)
4-WD Pickup (Front)

DESCRIPTION

The axle assembly is the hypoid gear-type with integral carrier housing. The pinion bearing preload adjustment is made with a spacer and washer between the front and rear bearing cones.

The differential side bearing preload and the pinion depth adjustment are made by shims. Driving power is transmitted to the axle by ball spline type drive shaft with universal joints at both ends.

AXLE RATIO & IDENTIFICATION

Datsun does not identify axles with a particular external identification marking. One basic type of axle assembly is used, with differences in ring gear diameter between model applications.

The R180 (180 mm ring gear) is used as the rear axle assembly on all Maxima sedans, all automatic transmission 280ZX models, and 2-seater 280ZX models with manual transmission. The R180 is also used as the front axle in all 4-WD Pickups.

The R200 (200 mm ring gear) is used in all 280ZX Grand Luxury and 2+2 models with manual transmission. To determine axle ratio, divide the number of ring gear teeth by the number of drive pinion gear teeth.

REMOVAL & INSTALLATION

FRONT AXLE DRIVE SHAFTS & BEARINGS

Removal (4-WD Pickup)

NOTE: To remove locking hub, refer to Locking Hubs article in this section, then proceed with removal procedure. Ensure locking knob is set to "Lock" before removal.

1) Raise and support vehicle. Remove tire and wheel. Remove caliper assembly. Remove locking hub cover retaining screws, and remove cover. Remove drive clutch snap ring and drive clutch. Remove rebound bumper and stabilizer bar-to-lower link bolt.

2) Remove axle shaft-to-differential carrier bolts and remove axle shaft. To ease removal, turn steering wheel in opposite direction.

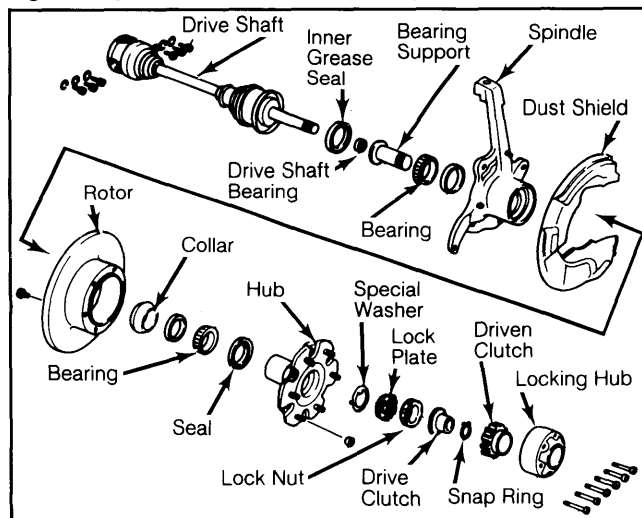
3) Remove knuckle arm-to-knuckle bolt. Support lower control arm with a jack and remove nuts holding upper and lower ball joint to control arms. Remove knuckle.

4) Using a screwdriver, straighten lock washer. Remove front wheel lock nut. Remove and discard lock washer and special washer. Remove inner grease seal. Push wheel bearing support out of wheel hub.

5) Separate hub from knuckle, using a slide hammer type puller. Remove bearing collar from spindle.

6) Drive out inner wheel bearing and grease seal by tapping outer race with brass drift and hammer. Separate hub and rotor. Remove outer wheel bearing and grease seal. Remove drive shaft bearing from bearing support with a drift.

Fig. 1: Exploded View of 4-WD Pickup Front Axle



Installation

1) To install, reverse removal procedure and note the following. Coat bearings and seals with grease and ensure seals are installed properly. Install same bearing collar that was removed, or use new bearing collar of same number. Always use new lock washer.

2) Tighten lock nut to specifications, and turn hub several times in both directions to seat bearing. Attach a spring gauge to steel stud, and check that wheel bearing preload is 2.2-9.5 lbs. (10-42 N).

3) If preload is higher than specified, replace bearing collar with a thicker collar (increase stamped number by 1).

4) If preload is lower than specified, replace bearing collar with a thinner collar (decrease stamped number by 1). Repeat procedure until correct preload is obtained.

5) When bearing preload is correct, bend lock washer tab up into lock nut groove, and install hub and knuckle assembly.

6) Before installing locking hub cover, adjust axle shaft end play to .004-.012" (.1-3 mm) by using a snap ring of proper thickness. Snap rings are available in 5 thicknesses from .043-.075" (1.1-1.9 mm) in .008" (.2 mm) increments.

REAR AXLE DRIVE SHAFTS & BEARINGS

Removal (Except 4-WD Pickup)

1) Raise and support vehicle. Remove tire and wheel. On Maxima models, remove brake drum. On 280ZX models, disconnect hydraulic line at caliper, and remove caliper and disc.

2) Disconnect drive shaft from axle shaft. Remove wheel bearing lock nut using rear axle stand and bar.

3) Draw out axle shaft using rear axle stand and slide hammer. Remove companion flange. Remove grease seal and inner bearing using a drift. Withdraw outer bearing from rear axle shaft using bearing puller.

NOTE: 280ZX models with R200 differential use flanges on both ends instead of a removable yoke with single retaining bolt on inner end.

Drive Axles

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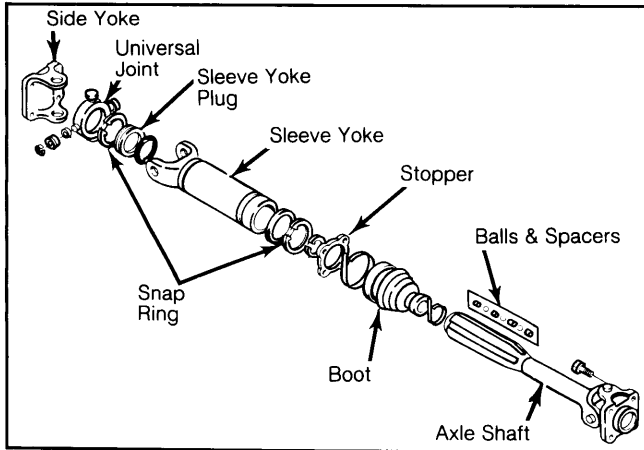
NOTE: Do not reuse bearings or grease seal after removal.

Installation

1) To install, reverse removal procedure and note the following. Clean and inspect all parts for wear or damage and replace as necessary. Grease wheel bearings and housing before installation.

2) When installing bearings, ensure outer bearing is installed with seal facing wheel and that inner bearing is installed with seal facing differential.

Fig. 2: Exploded View of Rear Axle Drive Shaft Assembly



R200 differential shown — R180 similar.

3) Axle housings are stamped with letter "M", "N" or "P". Be sure bearing spacer of same stamping is installed. Tighten lock nut to specifications and check that axle shaft end play is 0-.012" (0-.3 mm).

4) If either adjustment is not correct, replace bearing spacer and repeat procedure. Bleed and adjust brakes.

PINION FLANGE & OIL SEAL

Removal

Raise and support vehicle. Drain differential. Disconnect propeller shaft from pinion flange. Hold pinion flange and remove pinion nut. Remove flange with puller. Remove oil seal.

Installation

1) To install, reverse removal procedure, noting the following. Apply grease between seal lips before installation. Tighten pinion nut to specifications.

2) Be sure pinion bearing preload is correctly adjusted. Fill differential to proper level with gear oil.

AXLE ASSEMBLY

NOTE: Drive shafts of 280ZX models are connected to R180 differential with yokes and to R200 differential with companion flanges.

Removal

1) Raise and support rear of vehicle. Drain differential gear oil. Disconnect propeller shaft at companion flange. Disconnect drive shafts at each wheel, and remove side yoke fixing bolts at differential. Remove side yokes and drive shaft assemblies.

2) On 280ZX, remove front shield. On all models, support differential on jack, and remove mounting bolts at suspension members. On Maxima models,

remove nut on end of differential bracket. On all models, lower assembly on jack and remove from vehicle.

NOTE: Support suspension member on a stand to prevent damage to insulators.

Installation

To install, reverse removal procedure. Tighten all nuts and bolts to specifications. Fill assembly to correct level with gear oil.

OVERHAUL

FRONT AXLE DRIVE SHAFT

NOTE: Manufacturer does not recommend disassembly of front drive shaft on 4-WD pickup. Replace as complete assembly only.

REAR AXLE DRIVE SHAFT

Disassembly (Except 4-WD Pickup)

1) Remove universal joint from differential end of drive shaft. Remove snap ring from sleeve yoke plug and remove plug. Compress drive shaft, and remove snap ring from stopper. Remove stopper.

2) Disconnect boot, and separate drive shaft carefully so as not to lose balls and spacers.

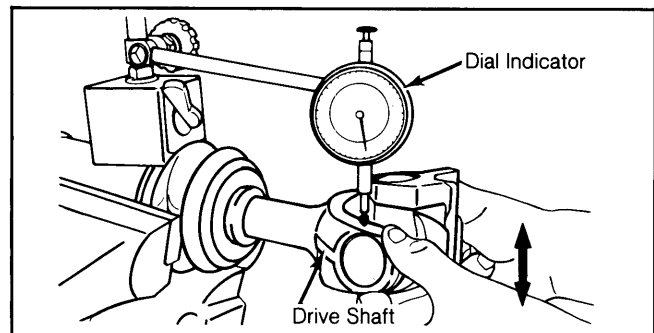
Cleaning & Inspection

1) Check rubber boot and oil seals for damage, and replace as necessary. Inspect drive shaft for straightness, cracks, damage, and distortion. Replace drive shaft if necessary.

2) Check all other components for wear, damage, and distortion. Replace complete drive shaft assembly if any faulty part is found. Check drive shaft play as shown in Fig. 3. Replace complete assembly if play exceeds .04" (1 mm) on Maxima or .008" (.2 mm) on 280ZX.

NOTE: Measurement should be taken with drive shaft fully compressed.

Fig. 3: Measuring Play in Rear Drive Shaft



Move shaft up and down with dial indicator installed.

Reassembly

1) To reassemble, reverse disassembly procedure, and note the following. Align yokes. Be sure steel balls and spacers are installed in correct order.

2) Adjust distance between spider journals (measured from center-to-center) to length of 13.54" (344 mm). Cover sleeve yoke with boot, and secure with boot band.

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3) Adjust axial play of universal joint to within .008" (.2 mm) by use of snap rings. Snap rings of equal thickness must be installed on each end of yoke sleeves.

4) Apply grease to ball grooves and oil grooves with about 1 1/4 ozs. (35 g) of oil in bottom end of sleeve yoke.

DIFFERENTIAL

NOTE: Front axle assembly of 4-WD Pickup is overhauled in same manner as that for Maxima models (R180 differential).

Disassembly

1) Mount differential carrier assembly in holding fixture, and remove rear mounting member and cover plate. Record backlash readings at several points around ring gear for use during reassembly.

2) On R180 differential, remove retainer bolts, and pull side retainers from case with puller.

NOTE: Retainers and shims of R180 differential must be marked for reassembly. Retainers and shims are not interchangeable.

3) On R200 differential, pry side flange out while holding with hand to prevent shims from jumping out of carrier. Remove bearing cap bolts and bearing caps.

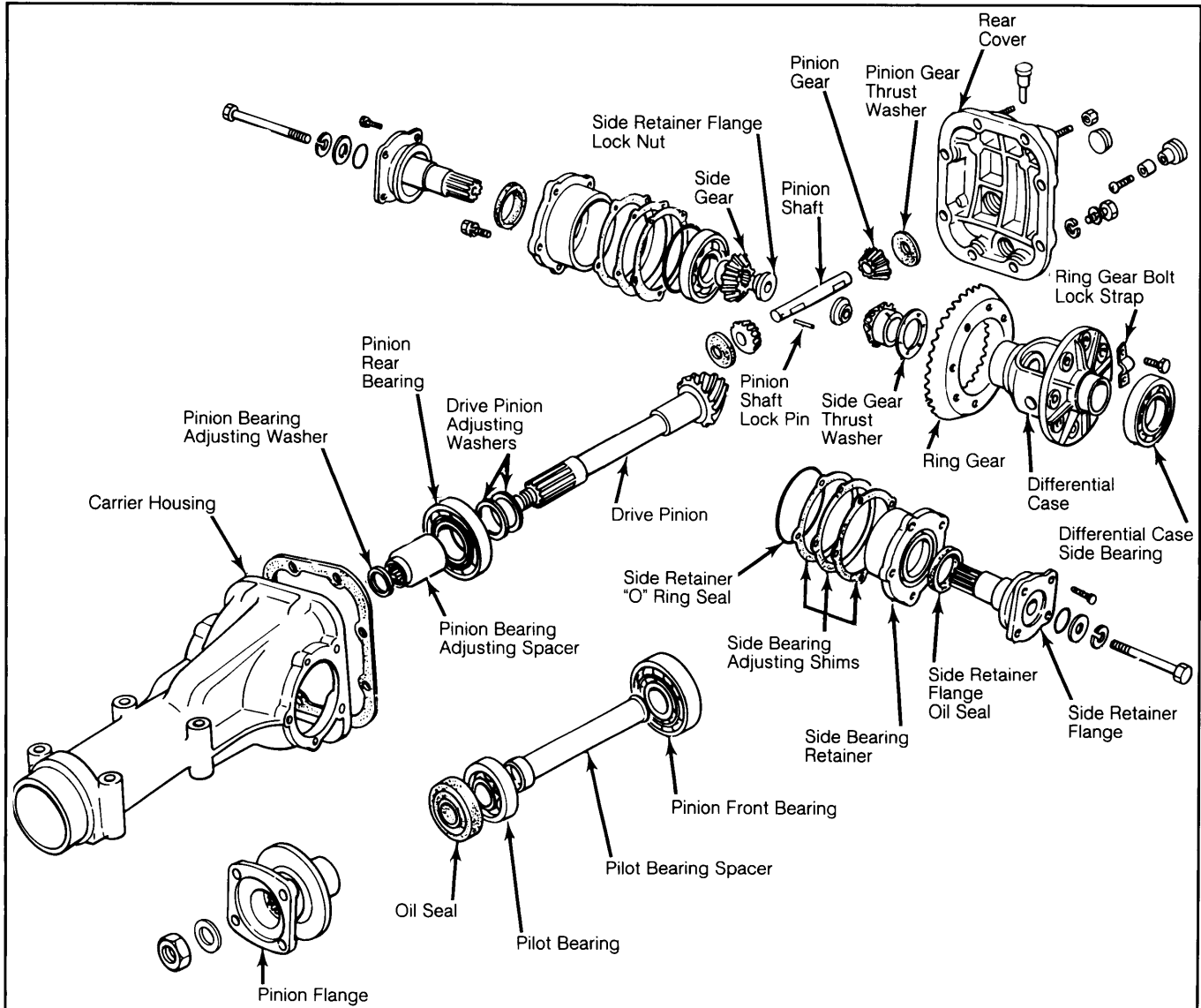
4) Mark carrier, caps, and bearing outer races so they may be reinstalled in original position.

5) On all models, extract differential case from carrier. On R180 differentials, remove side bearing outer races from retainers using a puller.

6) Hold pinion flange stationary, and remove pinion nut. Remove pinion flange with puller. Press drive pinion from carrier, and remove rear bearing inner race, bearing spacer, and adjusting washers. Remove oil seal.

7) Remove pilot bearing, together with pilot bearing spacer and front bearing inner race. Press rear bearing inner race from drive pinion. Drive out front and rear bearing outer races with a drift.

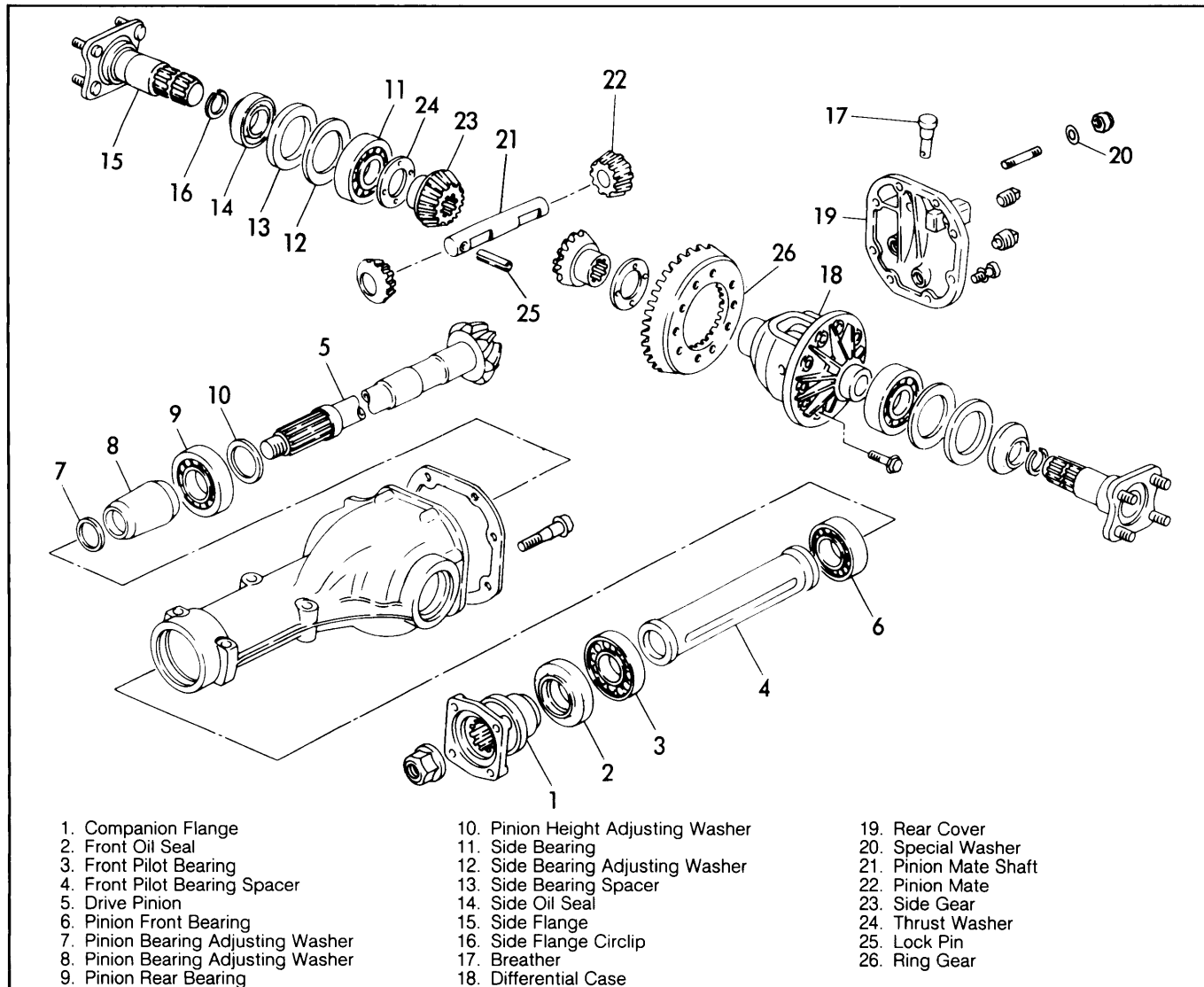
Fig. 4: Exploded View of Datsun R180 Integral Carrier Differential Assembly



Drive Axles

DATSUN/NISSAN INTEGRAL HOUSING (Cont.)

Fig. 5: Exploded View of Datsun R200 Integral Carrier Differential Assembly



NOTE: Keep left and right side bearings separate, as they are not interchangeable.

8) To disassemble differential case, remove side bearings with puller. Remove ring gear by unfolding lock strap and loosening bolts. Punch off pinion shaft lock pin from ring gear side.

9) Remove pinion shaft, pinion gears, side gears, and thrust washers. Thoroughly clean and inspect all parts for wear or damage, and repair or replace as necessary.

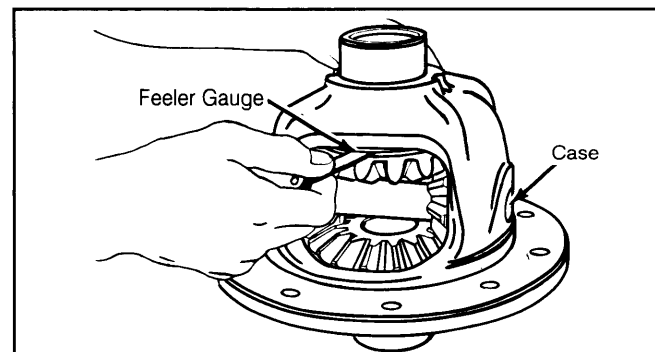
NOTE: Mark gears and thrust washers for installation in their original positions.

Reassembly & Adjustment (Differential Case Assembly)

1) Assemble pinion gears, side gears, and thrust washers in original positions in differential case. Fit pinion shaft to differential case so that it aligns with lock pin holes.

2) Adjust side gear-to-pinion gear backlash, or adjust clearance between rear face of side gear and thrust washer. Install pinion shaft lock pin and lock in place with punch.

Fig. 6: Measuring Side Gear-to-Thrust Washer Clearance



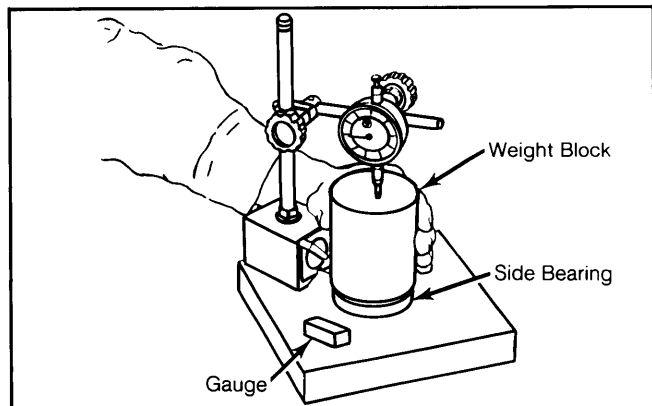
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3) Apply gear oil to gear tooth surface and thrust surfaces, and ensure gears rotate smoothly. Install ring gear on differential case, and install bolts and new lock washers.

NOTE: Tighten ring gear bolts diagonally, while tapping around bolt heads with hammer.

4) When replacing side bearings, measure bearing width with a .787" (20 mm) gauge and weight block. Bearing width should be slightly smaller than gauge.

Fig. 7: Measuring Side Bearing Width



Bearing width should be smaller than gauge.

5) Press fit side bearing inner race on differential case and side bearing outer race into side retainers. Install new oil seal on side retainer, and apply grease to cavity between seal lips.

NOTE: R200 differential has non-removable side bearing retainers. R200 bearings are .827" (21 mm) wide.

Reassembly and Adjustment (Drive Pinion Bearing Preload)

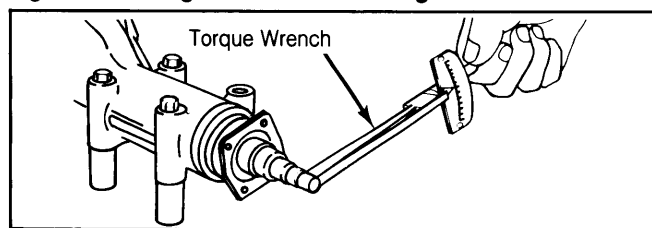
1) Install front and rear bearing outer races into carrier. Install dummy pinion shaft with rear bearing and original pinion depth washer between bearing and pinion head.

2) If ring and pinion gear contact pattern was NOT correct at time of disassembly, use new pinion depth washer .122" (3.09 mm) thick.

3) Install pinion bearing preload spacer and washer, front bearing cone, drive pinion dummy collar, companion flange, and nut onto dummy shaft. Do not install oil seal at this time. Tighten nut to specified torque.

4) If pinion shaft cannot be turned by hand during entire process of tightening nut, replace preload spacer and washer with thicker ones.

Fig. 8: Checking Drive Pinion Bearing Preload



Preload torque is adjusted with shims.

5) Using an INCH pound torque wrench, check rotating torque of pinion shaft. If preload is not within specification, install a thicker adjusting washer to decrease preload torque or a thinner washer to increase preload torque.

Reassembly & Adjustment (Drive Pinion Gear Installed Height)

1) Leave dummy drive shaft installed (as described under Preload Adjustment), and install height gauge bearing bores of carrier. Measure clearance between end of pinion gear head and height gauge using feeler gauge.

2) Thickness of drive pinion height adjusting shim can be determined by the appropriate formula in the Pinion Height Shims table.

NOTE: Formula values are given in millimeters. If values signifying H, D, and S are not given, regard them as zero.

PINION HEIGHT SHIMS

Differential Application	Formula
R180	$T = W + N - ((H - D' - S) \times .01) - .2$
R200	$T = N - ((H - D') \times .01) + 3.0$

T = Thickness of adjusting washer needed.

W = Thickness of washer temporarily installed.

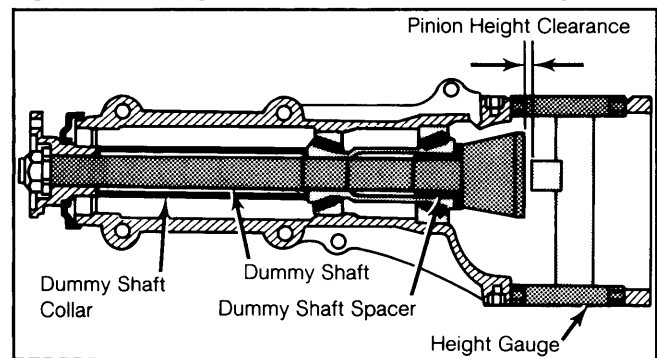
N = Clearance between gauge and dummy shaft.

H = Figure marked on drive pinion head.

D = Figure marked on dummy shaft.

S = Figure marked on height gauge.

Fig. 9: Measuring Drive Pinion Gear Installed Height



For correct shim thickness refer to appropriate formula.

3) After determining correct thickness of required pinion height adjusting washer, remove dummy shaft and height gauge. Fit correct pinion height adjusting washer on drive pinion gear, and press fit rear bearing inner race.

4) Lubricate pinion bearings, install drive pinion gear, pinion bearing spacer and washer, pilot bearing race, pilot bearing spacer, pilot bearing, and oil seal. Install pinion flange, and tighten pinion nut to specified torque.

Reassembly & Adjustment (Side Bearing Preload)

1) Required thickness of left and right side retainer shims can be obtained by using the appropriate formula in the Side Bearing Shims table.

Drive Axles

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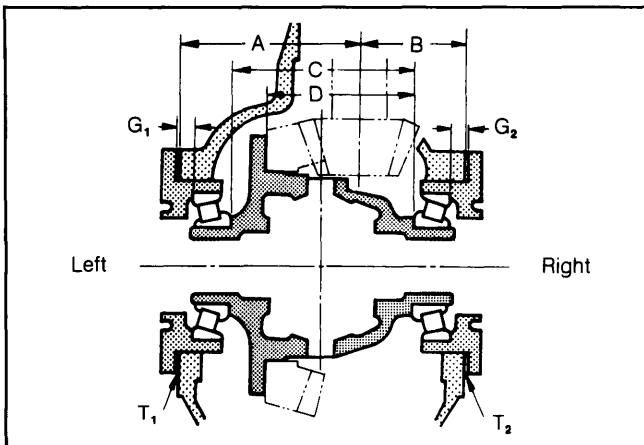
NOTE: Formula values are given in millimeters. If value signifying A, B, C, D, G₁, and G₂ are not given, regard them as zero.

SIDE BEARING SHIMS

Differential Application	Formula
R180	$T_1 = (A + C + G_1 - D) \times .01 + .76 - E$ $T_2 = (B + D + G_2) \times .01 + .76 - F$
R200	$T_1 = (B - D + H') \times .01 + E + 2.05$ $T_2 = (B - D + H') \times .01 + F + G + 1.95$

T₁ = Required thickness of left side retainer shim.
 T₂ = Required thickness of right side retainer shim.
 A & B = Figure marked on gear carrier.
 C & D = Figure marked on differential case.
 E & F = Difference in width of left or right bearing.
 G₁ & G₂ = Figure marked on left or right retainers.
 G = Standard spacer (8.10 mm) thickness difference.
 H' = Variation figure marked on ring gear.

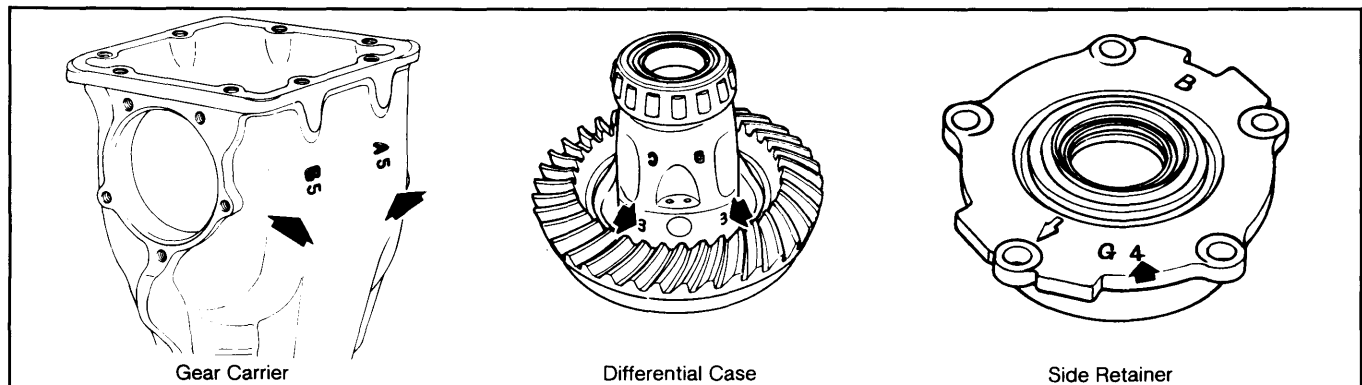
Fig. 10: Side Bearing Preload Formula Values



2) On R180 differentials, install differential case assembly in gear carrier in reverse order of disassembly. Fit correct shims and "O" ring seal in both side retainers in carrier. Arrow should point as shown in Fig. 12.

3) On R200 differentials, install differential case assembly with side bearing outer races into gear carrier. Insert side bearing washers, and drive in spacer between right side washer and housing.

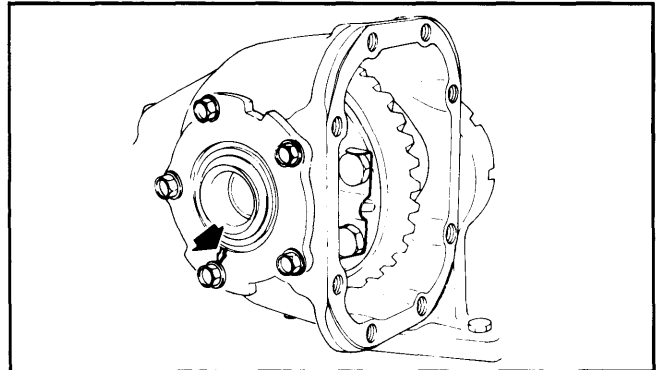
Fig. 11: Side Bearing Preload Identification Marks (R180 Differential Shown)



4) Align marks on bearing cap and carrier and install bolts. Tighten to specifications.

NOTE: Use care in installing spacer to avoid tilting side bearing outer race.

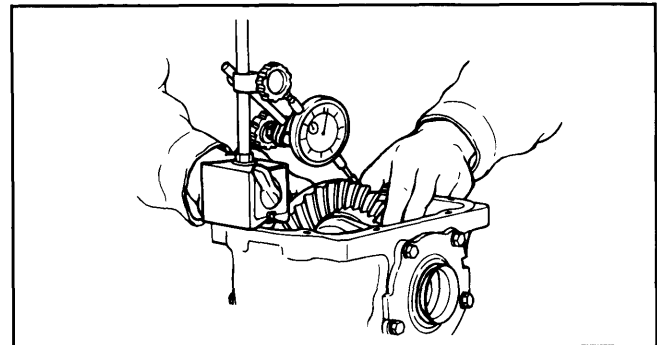
Fig. 12: Aligning Side Retainer During Installation



Note the position of arrow.

5) Using dial indicator, measure ring gear-to-drive pinion backlash and adjust if necessary. Check side bearing preload, and adjust if necessary by adding or removing side retainer shims.

Fig. 13: Measuring Ring Gear Backlash



NOTE: If side bearing preload is readjusted, ring gear-to-drive pinion backlash must be checked and, if necessary, adjusted.

Final Inspection & Reassembly

1) After all adjustments are to specifications, make tooth contact pattern test and make any necessary

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corrections. See Gear Tooth Contact Pattern at beginning of this section.

2) Install rear cover and tighten nuts to specifications. Refill axle assembly to correct level with gear oil.

AXLE ASSEMBLY SPECIFICATIONS

Application	Specification INCH Lbs. (N.m)
Pinion Bearing Preload	
Without Oil Seal	
All Models	9-11 (1.0-1.2)
With Oil Seal	
Pickup	8-15 (.90-1.7)
All Others	9.5-12 (1.07-1.3)
	In. (mm)
Ring Gear-to-Pinion Backlash	
280ZX (R180 Differential)004-.008 (.10-.20)
All Others005-.007 (.13-.18)
Side Gear Backlash004-.008 (.10-.20)

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Wheel Bearing Lock Nut	
Pickup (Front)	108-145 (147-196)
All Others	181-239 (246-325)
Drive Shaft Flange Bolts	
R180 Differential	23-31 (31-42)
R200 Differential	36-43 (49-58)
Pinion Flange-to-Propeller Shaft Flange	
Maxima	17-24 (23-37)
All Others	25-33 (34-45)
Rear Cover Bolts	
280ZX (R200 Differential)	12-17 (16-23)
Maxima	14-19 (19-26)
All Others	29-30 (39-41)
Rear Cover-to-Mount	
R180 Differential	43-58 (58-78)
R200 Differential	65-87 (88-118)
Drive Pinion Nut	
R180 Differential	123-145 (167-197)
R200 Differential	137-159 (186-216)
Ring Gear Bolts	
R180 Differential	65-72 (88-98)
R200 Differential	43-51 (58-69)
Side Bearing Retainer Bolts	
R180 Differential	6.5-8.7 (9-12)
Side Bearing Cap Bolts	
R200 Differential	65-72 (88-98)