

AXLE SHAFTS - FRONT

1988 Toyota Celica

1988 FWD AXLE SHAFT & CV JOINTS
Toyota

All Models

DESCRIPTION

Axle shaft transfer power from transaxle to driving wheels. All axle shafts consist of a shaft and flexible Constant Velocity (CV) joint at each end. Inner CV joint is splined or bolted to transaxle. Outer CV joint is splined to hub assembly and secured by axle shaft nut.

The inner and outer CV joints are enclosed by a CV joint boot. The boot maintains lubrication in the joint and prevents contamination from entering the joint. Boots must be replaced when signs of leakage or cracks are present. The Inner CV joint can be repair without replacing assembly. The outer CV joint must be replace as an assembly.

There are 3 different types of axle shaft CV joints. The Double Offset Joint (DOJ). The Brifield Joint (BJ) and the Tripod Joint (TJ), (sometimes referred as tripod).

TROUBLE SHOOTING

TROUBLE SHOOTING CHART TABLE

Condition	Possible Cause
Grease Leaks	CV boot torn or cracked
Clicking Noise on Cornering	Damaged Outer CV
Clunk Noise on Acceleration	Damaged Inner CV
Vibration or Shudder on Acceleration ..	Sticking, damaged or worn CV Misalignment or spring height

REMOVAL & INSTALLATION

NOTE: For information on rear axle shafts on Celica and Camry All-Trac and MR2, see RWD AXLE SHAFTS & CV JOINTS article in this section.

Removal (Camry)

1) Remove hub cap, cotter pin and lock nut. Loosen and remove lock nut from wheel bearing. Remove engine undercover. Remove front fender apron seal.

2) Use paint to apply mating marks to axle shaft flange and side gear shaft flange; DO NOT use punch marks. Apply the brakes and remove 6 retaining nuts on each inboard axle shaft flange.

3) Disconnect steering knuckle from lower ball joints. Drain transaxle fluid. Remove axle shafts from transaxle. On All-Trac and V6 models, DO NOT compress inboard CV joint boot or CV joint will come apart. The drive shaft retaining bolts and washers may be used to keep CV joint together. See Fig. 13.

4) On all models, use plastic hammer to drive axle shaft out of bearing hub. Loosen center drive shaft lock bolt. Remove snap ring from bearing bracket and pull out center drive shaft.

NOTE: Use NEW center drive shaft bearing lock bolt on installation.

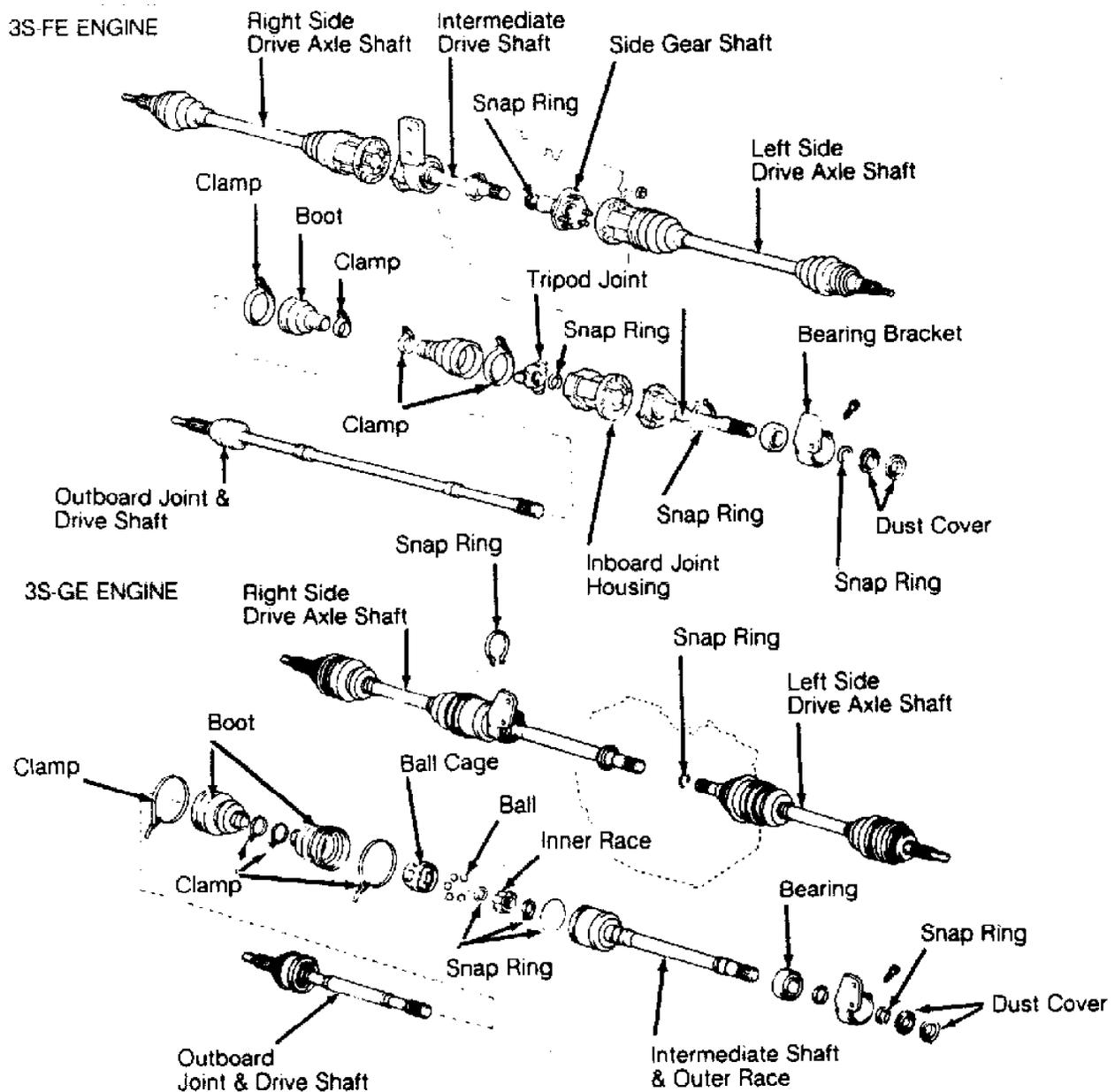


Fig. 1: Exploded View of Camry Drive Axle Shafts
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

5) If necessary to remove side gear shaft, push side gear shaft into differential. Measure and note distance between transaxle case and side gear shaft.

6) Using a slide hammer, pull the center drive shaft out of transaxle. Inspect side gear and side gear shaft seal for damage, replace if necessary.

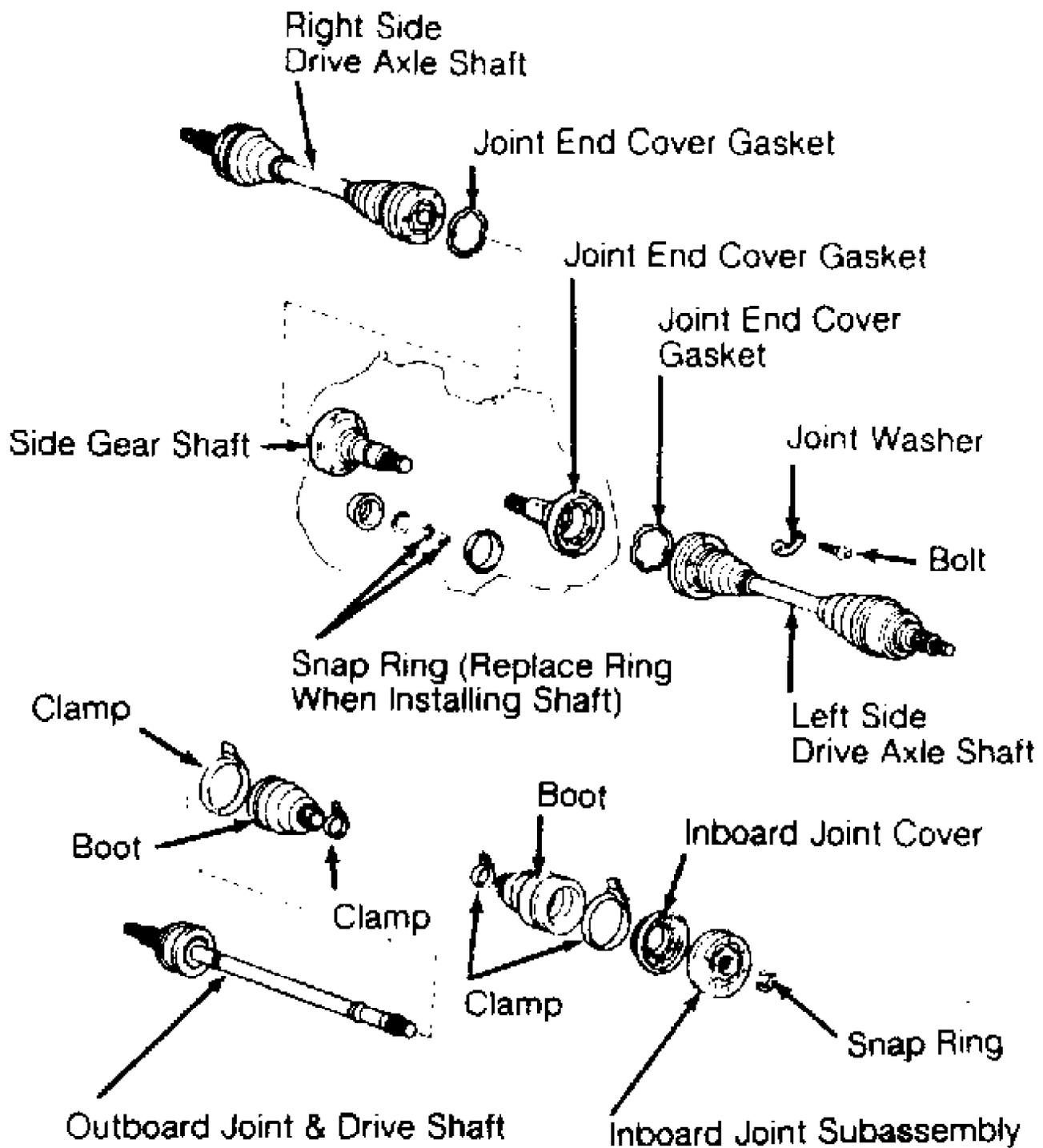


Fig. 2: Exploded View of Camry All-Trac Drive Axle Shafts
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

Removal (Celica)

1) Remove hub cap, cotter pin and lock nut cap. Apply the

brakes and remove the lock nut. Remove cover located under engine (if equipped).

2) On 3S-GE engine, drain transaxle fluid and remove the protector cover located on the left side drive axle shaft at transaxle. On 3S-FE engine, paint mating marks on drive shaft flanges. Loosen 6 nuts (each axle), retaining axle shaft to center drive shaft or side gear shaft. See Fig. 3.

3) On both types, separate tie rod from the steering knuckle. Disconnect steering knuckle from the lower control arm. Cover CV joint boot with a shop cloth to protect from damage during removal.

4) On 3S-FE, use Puller (SST09950-20017) to separate the axle shaft from steering knuckle. Remove the axle shaft from the vehicle.

5) On the 3S-GE engine, left axle shaft, place an index mark on the shaft and measure the distance from transaxle case to index mark. Note distance for reassembly. Using Drive Axle Puller (SST09520-32060) and slide hammer, remove the axle shaft from transaxle. See Fig. 9. Using Puller (SST09950-20016), separate axle shaft from steering knuckle.

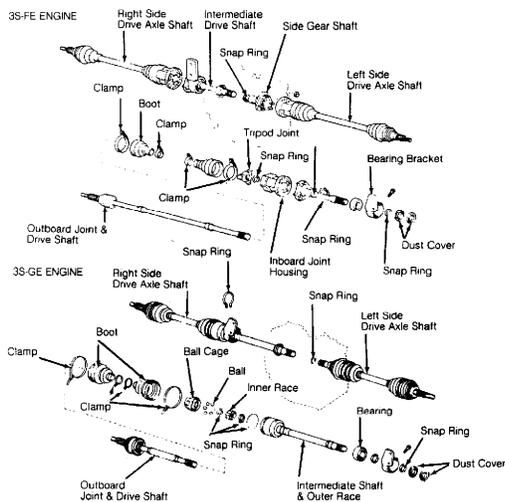
CAUTION: Always replace snap ring in inboard axle shaft before installation.

6) On 3S-GE engine, right axle shaft, separate shaft from steering knuckle with Puller (SST09950-20016). Remove snap ring from center drive shaft and remove the center drive shaft and axle shaft as an assembly.

7) On 3S-FE engine, drain the transaxle fluid. Remove and discard the center bearing lock bolt. Using pliers, remove the snap ring from the center drive shaft. Remove the center drive shaft. Always discard snap ring and center bearing lock bolt and replace during installation.

8) If necessary to remove side gear shaft, push side gear shaft into differential. Measure and note distance between transaxle case and side gear shaft.

9) Using a slide hammer, pull the center drive shaft out of transaxle. Inspect side gear and side gear shaft seal for damage, replace if necessary.



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Fig. 3: Exploded View of Celica Drive Axle Shafts
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Removal (Celica All-Trac)

- 1) Remove hub cap, cotter pin and axle shaft lock nut cap. Apply the brakes and remove the axle shaft lock nut. Remove cover located under engine (if equipped).
- 2) Separate tie rods and lower control arms from steering knuckle. Paint mating marks on inboard drive axle shafts and side gear shaft flanges. Loosen the 6 Allen bolts securing inboard drive axle shafts to side gear shafts. See Fig. 4.
- 3) Push steering knuckle outward and separate drive axle shaft from side gear shafts. DO NOT compress the inboard CV boot or CV joint will come apart. The drive shaft retaining bolts and washers may be used to keep CV joint together. See Fig. 13. Remove the joint end cover gasket from the drive axle shaft.
- 4) Cover inboard CV joint to prevent dirt from entering joint. Use plastic hammer to remove outboard CV joint from hub.
- 5) If necessary to remove side gear shaft, push side gear shaft into differential. Measure and note distance between transaxle case and side gear shaft.
- 6) Using a slide hammer, pull the center drive shaft out of transaxle. Inspect side gear and side gear shaft seal for damage, replace if necessary.

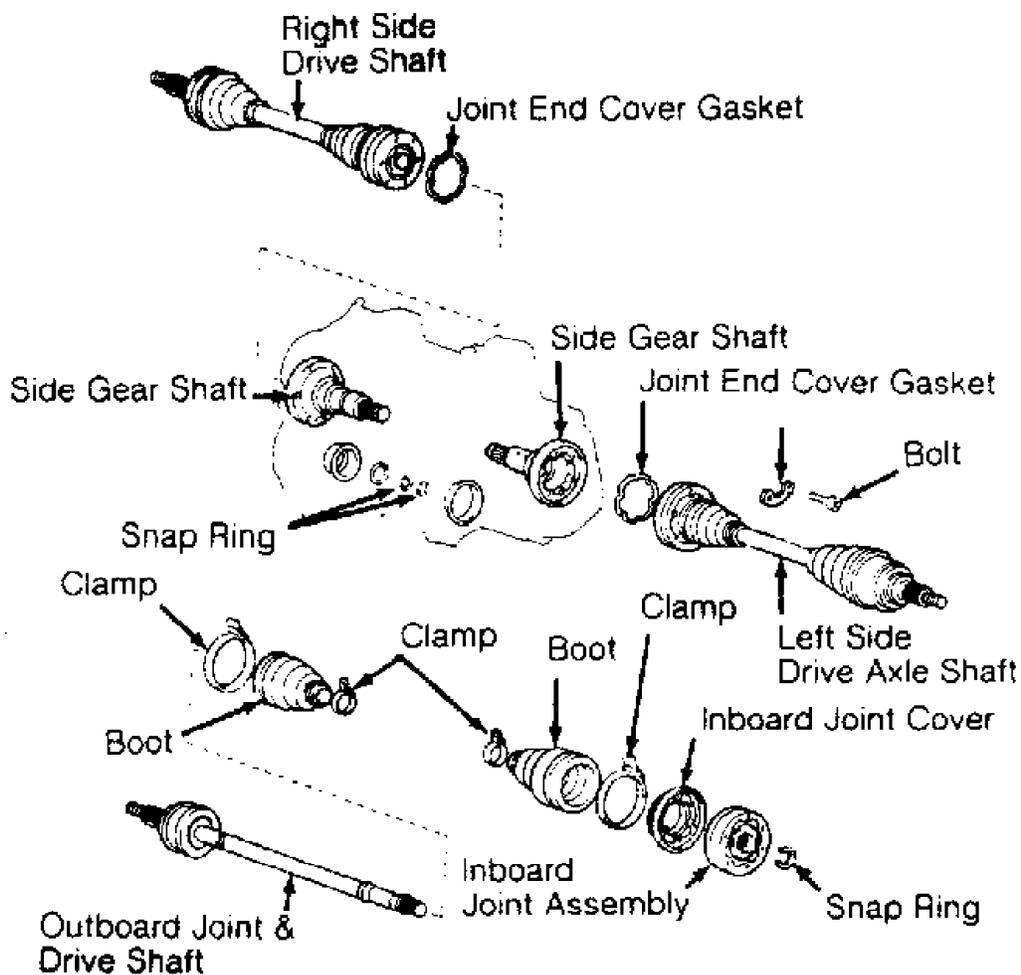


Fig. 4: Exploded View of Celica All-Trac Drive Axle Shafts
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

Removal (Corolla & FX)

- 1) Remove hub cap, cotter pin and axle shaft lock nut cap.

Apply brakes and remove the axle shaft lock nut. Apply brakes and loosen the nuts retaining axle shaft to transaxle side gear shaft. See Fig. 5.

2) Remove engine undercover. Loosen 6 nuts retaining front drive shaft to differential side gear shaft. On Corolla with 4A-F engine, use pry bar to separate drive axle shaft from transaxle. On all models, remove brake caliper and rotor without disconnecting brake line. Support caliper on shock strut.

3) Disconnect steering knuckle from lower control arm. Using Puller (SST09950-2017), remove axle shaft from steering knuckle. Cover CV joint boot with shop cloth to prevent damage. Place mating marks on axle shaft and side gear flanges, and remove retaining nuts. Remove axle shaft.

4) If necessary to remove side gear shaft, push side gear shaft into differential. Measure and note distance between transaxle case and side gear shaft.

5) Using a slide hammer, pull the center drive shaft out of transaxle. Inspect side gear and side gear shaft seal for damage, replace if necessary.

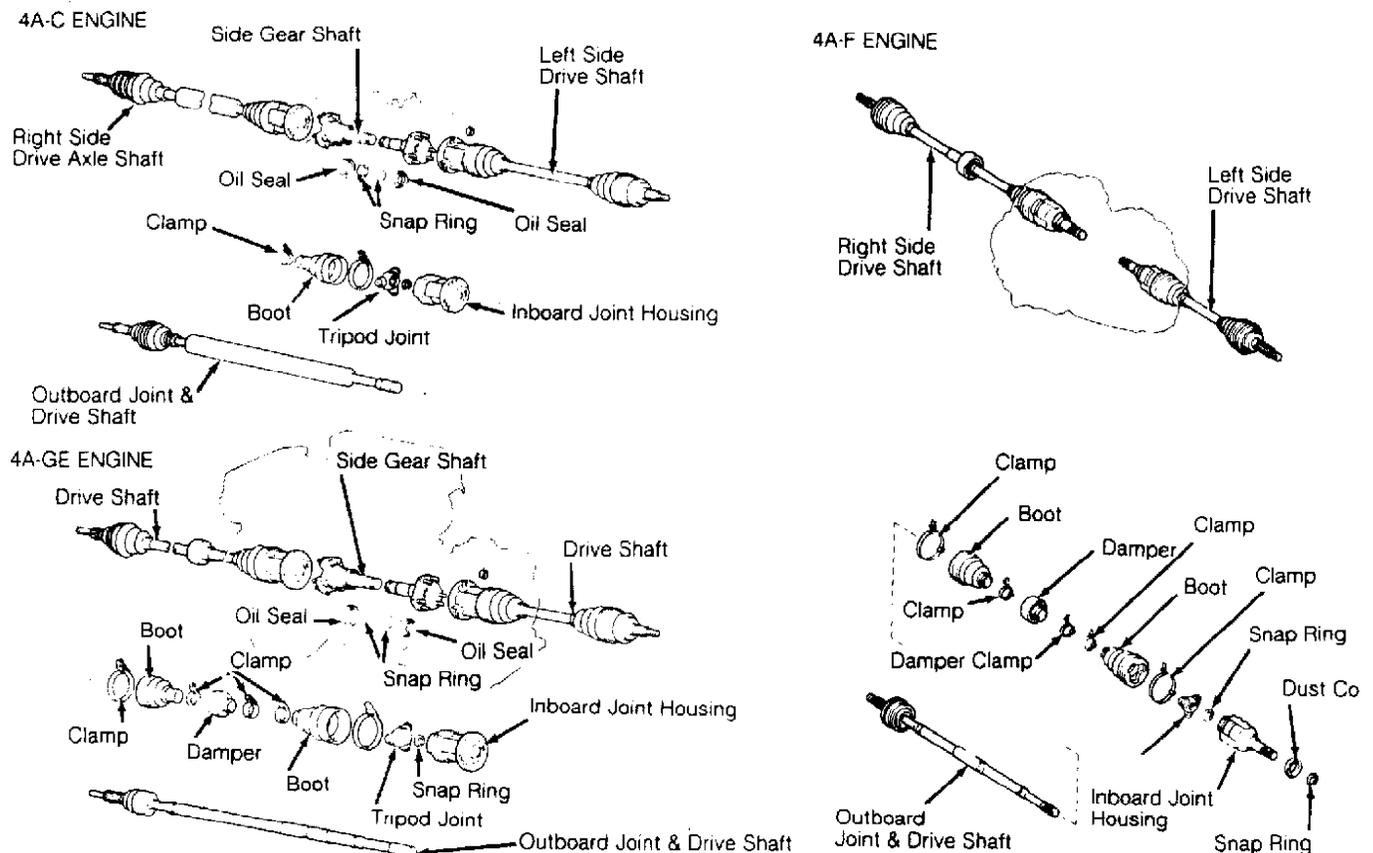


Fig. 5: Exploded View of Corolla & FX Drive Axle Shafts
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Removal (Pickup, Van & 4Runner)

1) On models with manually locking front hubs, place free-wheeling hub cover in the "FREE" position. On manual and automatic locking hubs, remove the center hub body bolt and washer.

2) Remove the hub body mounting nuts and washers. Remove cone washers by tapping on bolt heads with brass drift and hammer. Remove hub body.

3) On automatic locking hubs, use a screwdriver and remove the locking hub brake subassembly snap ring. Remove the brake subassembly. Using a torx socket, remove screws and remove the locking hub brake drum.

4) Loosen retaining nuts attaching inboard axle shaft to front differential. See Fig. 6. Remove snap ring from outboard end of axle shaft. Remove retaining nuts and slide axle shaft toward steering knuckle until free from differential. Pull axle shaft down and away out of steering knuckle.

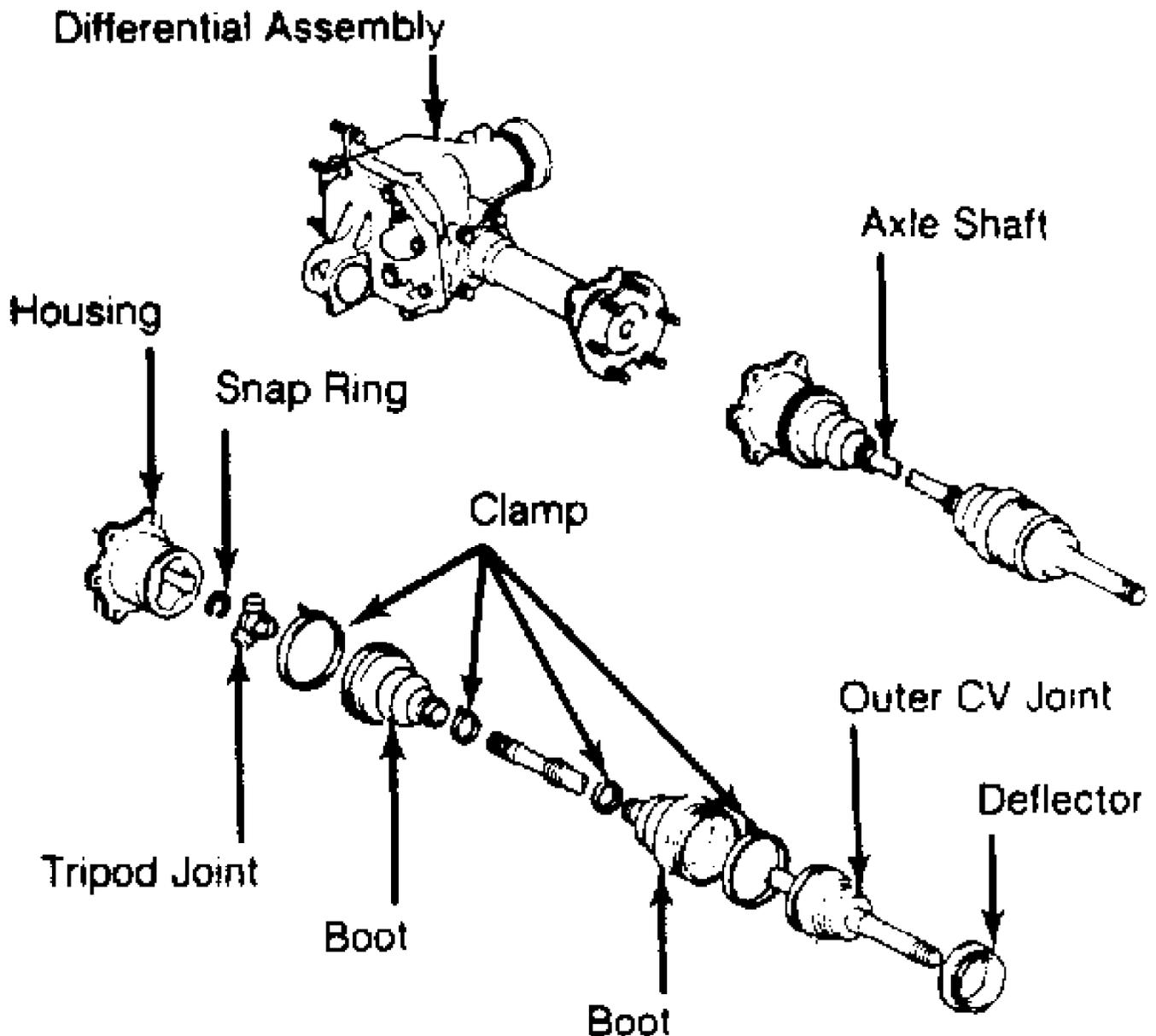


Fig. 6: Exploded View of Pickup, Van & 4Runner Drive Axle Shaft
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

Removal (Tercel)

1) Remove engine undercover and drain gear oil. Remove hub cap, cotter pin and bearing lock nut. Apply brakes and remove outboard drive axle lock nut.

2) Remove brake caliper without disconnecting brake line. Hang caliper on suspension strut. Remove brake rotor.

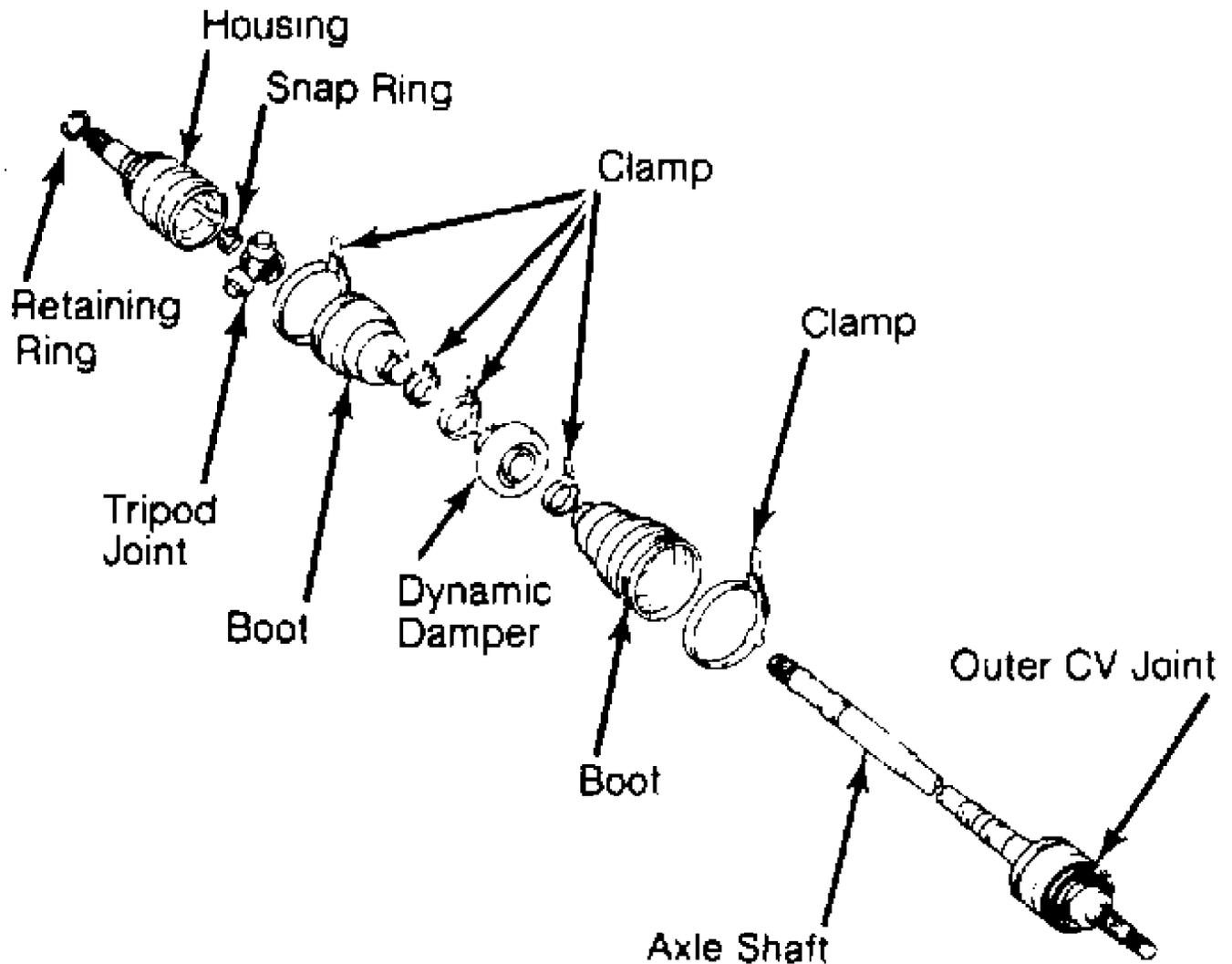


Fig. 7: Exploded View of Tercel Drive Axle Shaft
Courtesy of Toyota Motor Sales, U.S.A., Inc.

3) Disconnect tie rod from steering knuckle. Index shock absorber lower bracket and the steering knuckle camber adjusting cam to ensure reassembly to original position. Remove the shock absorber mounting bolts and disconnect shock absorber from steering knuckle. Use a plastic hammer to drive axle shaft from steering knuckle.

4) On Tercel Sedan, place shop cloth on CV joint boot to prevent damage during removal. Push axle shaft all the way into transaxle and measure distance between axle shaft to transaxle case.

5) Using Puller (SST09520-10021) and slide hammer, tap the axle shaft out of the transaxle and remove axle shaft. See Fig. 9. Insert Transaxle Stopper (SST09563-16010) into transaxle to prevent fluid leakage.

6) On Tercel Wagon, remove the stiffener plate on the transaxle assembly (left side). Using Axle Shaft Remover/Installer (09648-16010) and hammer, tap axle shaft out of transaxle. See Fig. 8.

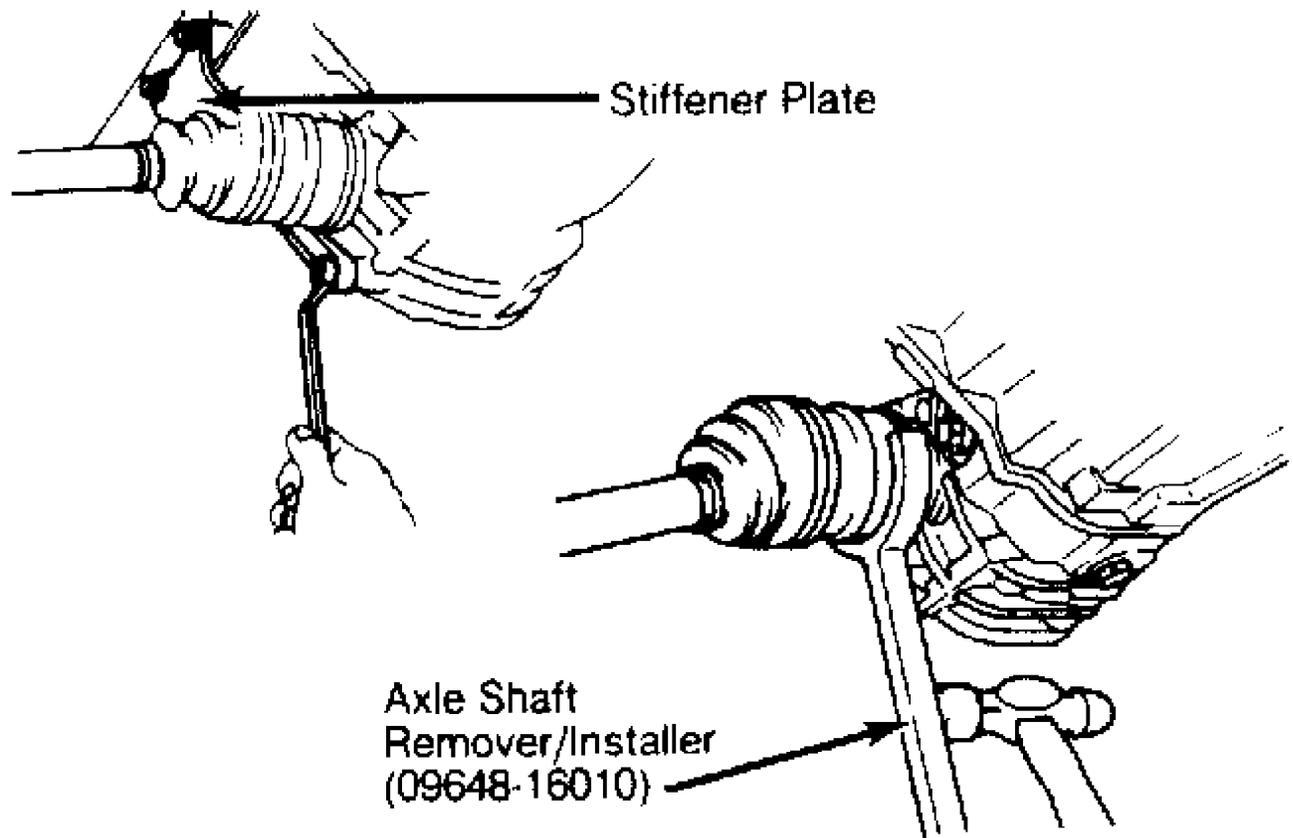


Fig. 8: Removing Tercel Wagon Drive Axle Shaft
Courtesy of Toyota Motor Sales, U.S.A., Inc.

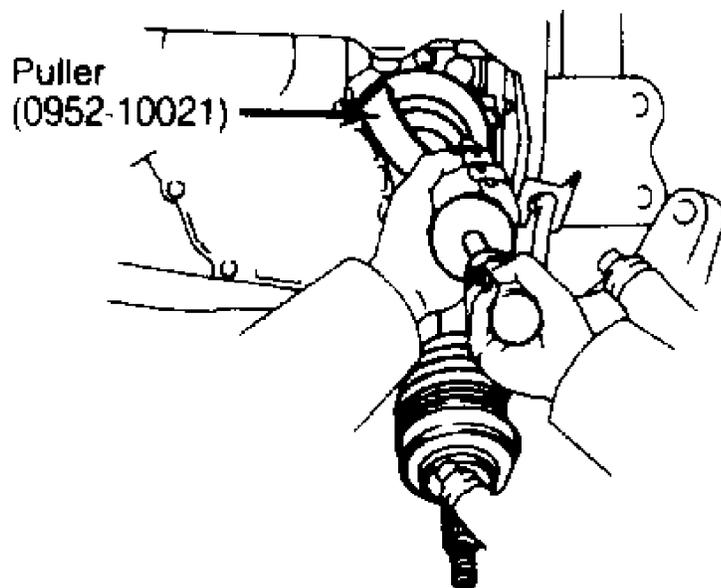


Fig. 9: Removing Drive Axle Shaft (Celica & Tercel Sedan)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Inspection

- 1) Ensure there is no play in the inboard and outboard CV

joints. Inboard joints should slide smoothly in the thrust direction.

2) There should not be excessive play in the radial direction of the inboard joint. Check for damage to boots.

Disassembly (Camry, Celica W/3S-FE, Corolla, Pickup, Tercel, Van, 4Runner)

1) Remove inboard CV joint boot clamp, and slide boot away from joint. Draw alignment marks on inboard CV joint housing, tripod and shaft with paint; DO NOT use pin punch to make mating marks.

2) Remove snap ring and outboard boot clamps. Remove inner CV joint housing from drive shaft. Place index marks on tripod joint and the axle shaft. Remove snap ring and drive tripod joint off drive shaft with brass drift and hammer.

CAUTION: Manufacturer does not recommend disassembling the outboard CV joint.

3) Remove inner CV joint boot. Remove damper clamp and damper from axle shaft (if equipped). On all models, remove outer CV joint boot clamps and slide boot off axle shaft. On Pickup and 4Runner, remove dust deflector on outboard shaft, if worn or damaged.

4) Inspect boots for cracks and leakage. Clean all parts and replace all defective parts.

Reassembly

1) Wrap axle shaft splines with vinyl tape to protect boot from damage during reassembly. Slide new boots onto axle shaft.

2) On the outboard joint, pack boot with new grease supplied with overhaul kit. Place boot clamp rings loosely over boots with open end of clamp away from direction of rotation. Do not tighten clamps at this time.

3) On Tercel Sedan, Tercel Wagon and Corolla (4A-F), install damper to axle shaft in correct position. Tighten clamps. See Figs. 9 and 10. On Corolla FX with 4A-GE engine, install damper on right side axle shaft. Ensure clamp sits in groove on shaft. See Fig. 11.

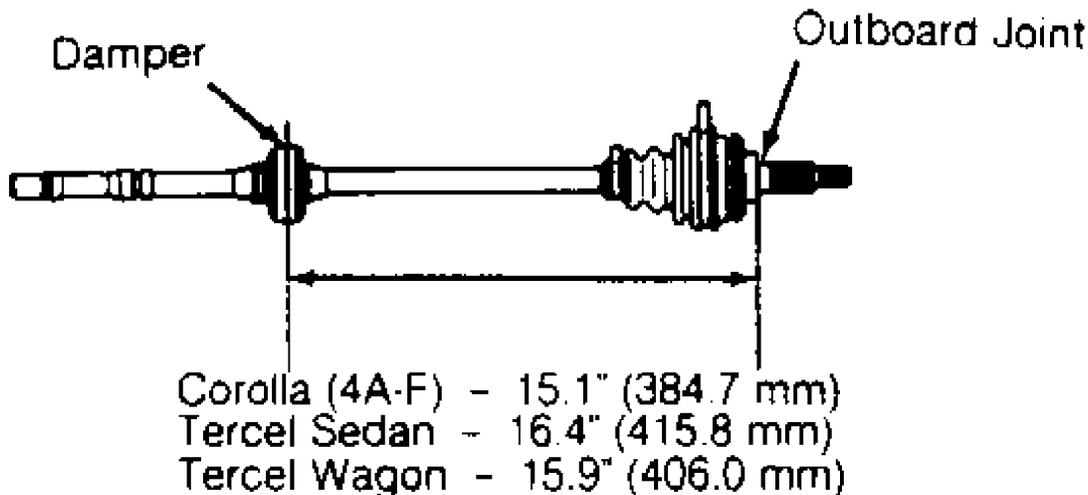


Fig. 10: Locating Damper on Corolla (4A-F Engine) & Tercel
Courtesy of Toyota Motor Sales, U.S.A., Inc.

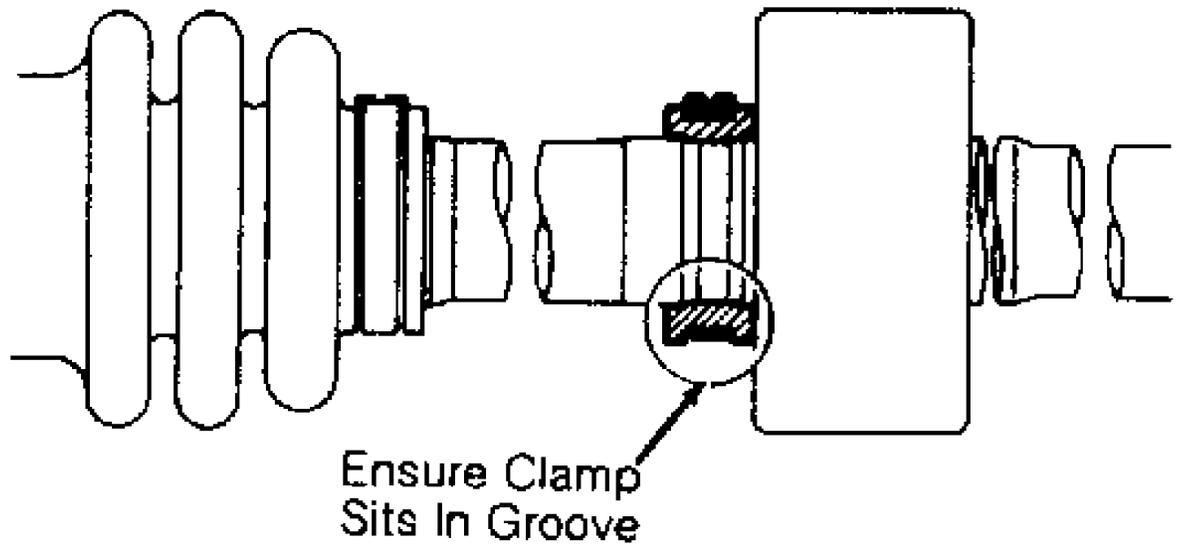


Fig. 11: Locating Damper on Corolla FX (4A-GE Engine)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

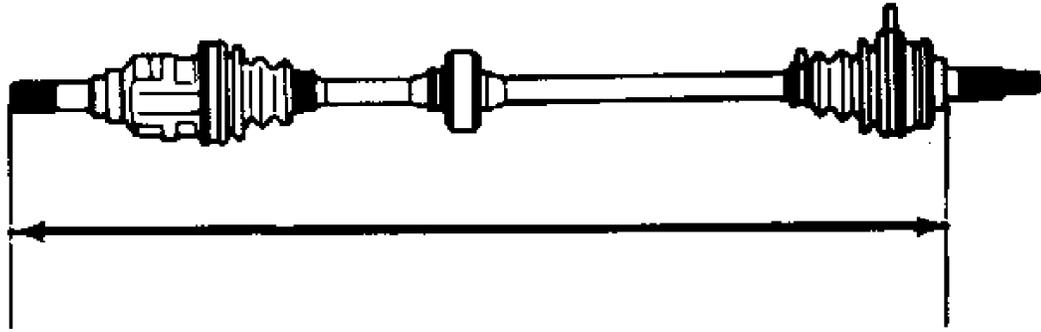
4) Place tripod onto shaft with beveled splines facing outer joint and align reference marks made at disassembly. Install a NEW snap ring on tripod joint.

NOTE: If tripod joint and axle shaft were not marked for reassembly reference, ensure one tripod stem and outer CV joint center are aligned. See Fig. 12.

5) Apply grease to tripod, housing and interior of inboard boot. Install the inboard housing over the tripod, aligning mating marks made at disassembly. Temporarily install boot over inboard housing without tightening housing side boot clamp.

6) Set axle shaft to standard length and ensure boots are not contracted or stretched. See Fig. 12. See TOYOTA AXLE SHAFT LENGTH table for correct dimensions. Install and tighten inner and outer clamps.

TERCEL & COROLLA (4A-F)



ALL OTHERS

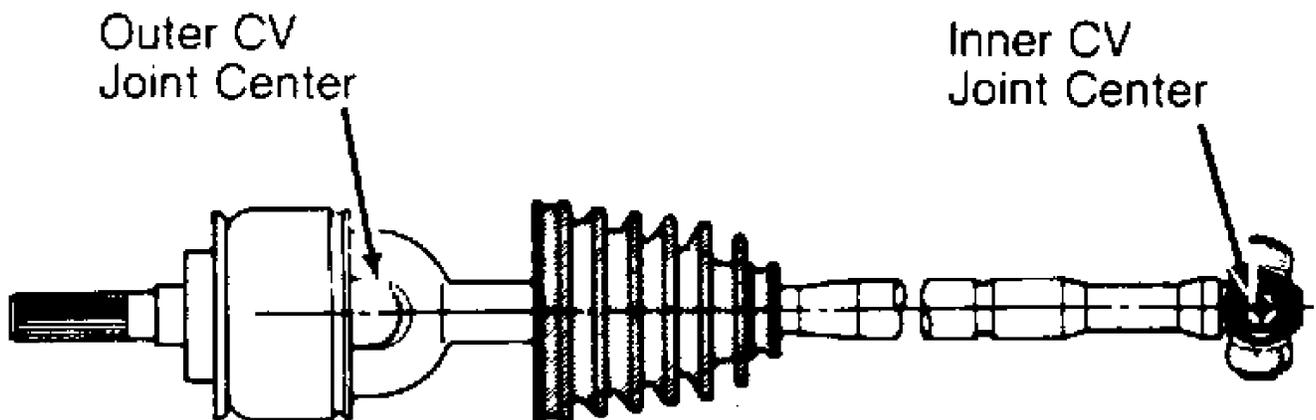
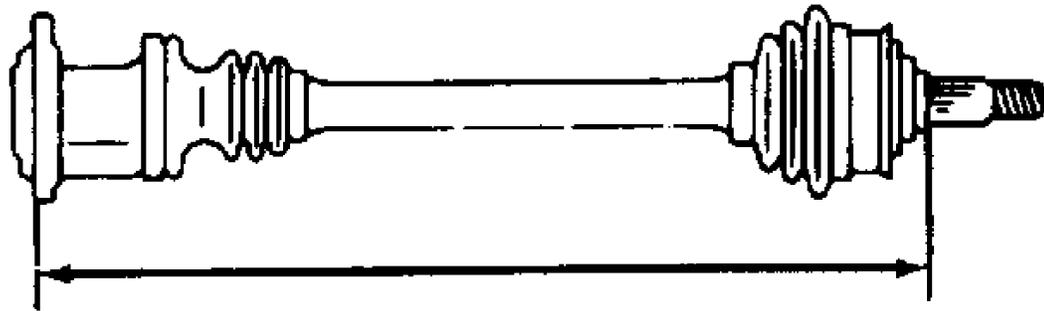


Fig. 12: Measuring Toyota Axle Shaft Standard Length
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Disassembly (Camry All-Trac & V6, Celica All-Trac)

1) Using paint, place mating marks on inboard CV joint, bearing cage, inner race and drive shaft for reassembly reference; DO NOT use pin punch for mating marks.

NOTE: On Camry V6 models, separate right side drive shaft from intermediate drive shaft.

2) Remove the snap ring from the inboard side of axle shaft. Using a socket, press and CV Joint Remover (09726-00030), remove the inboard joint from the drive shaft. See Fig. 13.

3) Using a screwdriver and hammer, pry the inboard joint from the joint cover. Keep inner and outer race together as joint is removed. Remove inboard and outboard boots. Replace boots if torn.

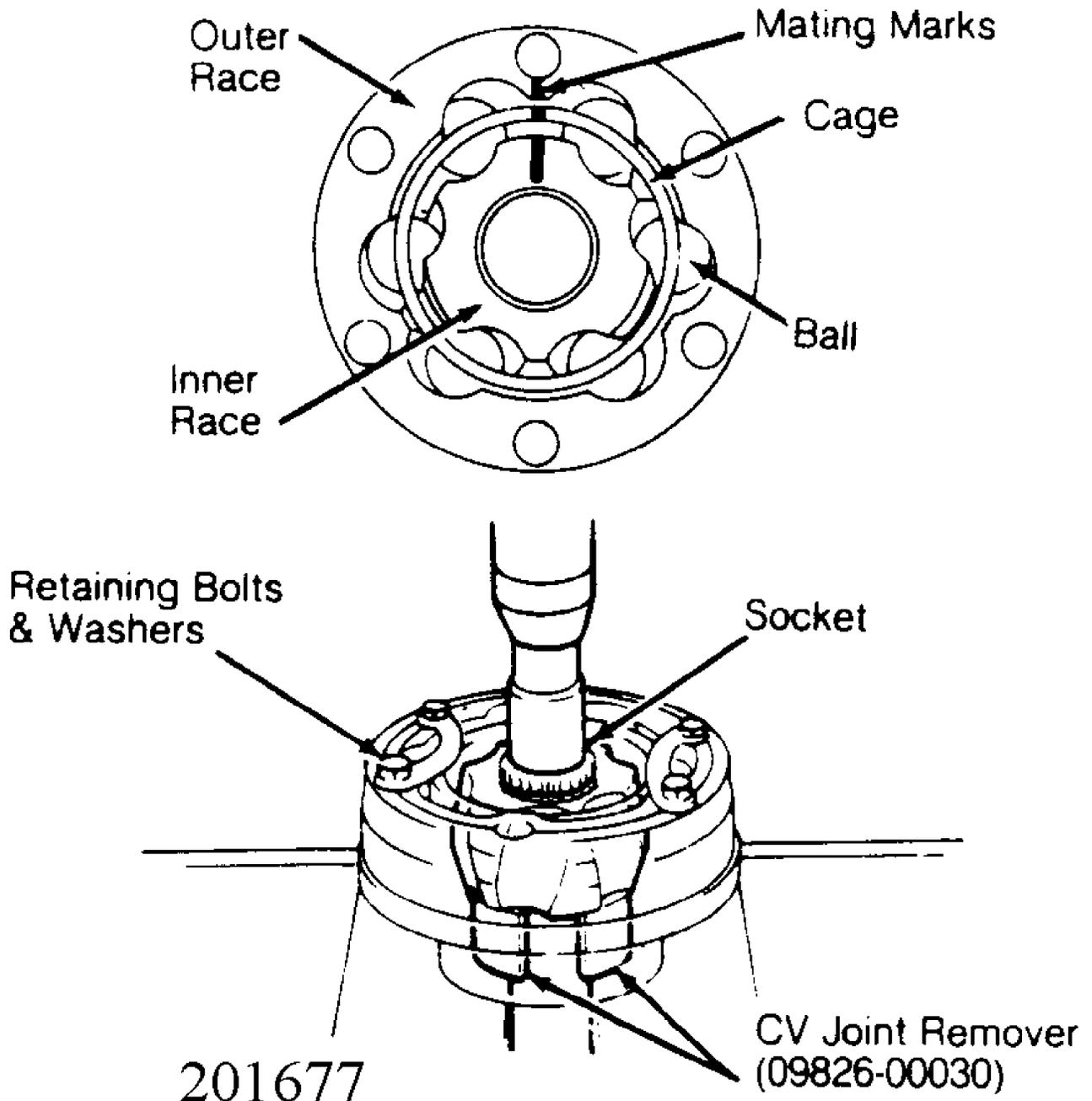


Fig. 13: Pressing Inboard CV Joint From Axle Shaft
Courtesy of Toyota Motor Co., U.S.A., Inc.

Reassembly

1) If inboard CV subassembly joint was disassembled, insert a

socket in the center of the inner race. Place outer race over inner race and insert the 6 balls into grooves. See Fig. 14. Lower outer race and cage so they fit tightly over inner race.

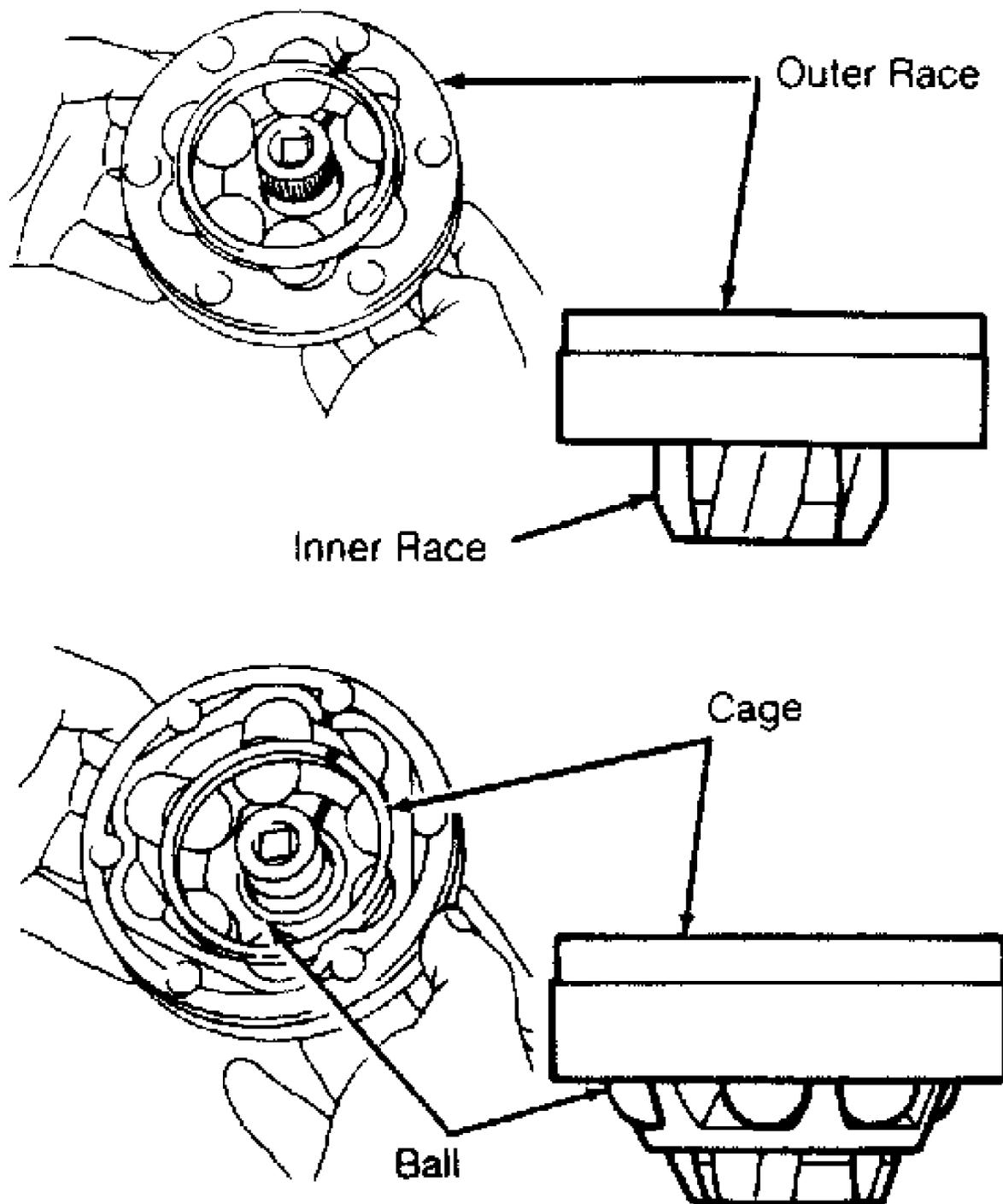


Fig. 14: Reassembling Inboard CV Joint
Courtesy of Toyota Motor Co., U.S.A., Inc.

2) Wrap axle shaft splines with vinyl tape to protect boot from damage during reassembly. Slide new boots onto axle shaft.

Install, but do not tighten, boot clamps.

3) Apply a bead of Three Bond 1121 to inboard joint cover. See Fig. 15. Align bolt holes of cover and inboard joint, and insert Allen bolts.

4) Using plastic hammer, tap cover onto inboard joint in a star pattern. Use numbered sequence in Fig. 15 as a guide. Use bolts and washers to keep CV joint together.

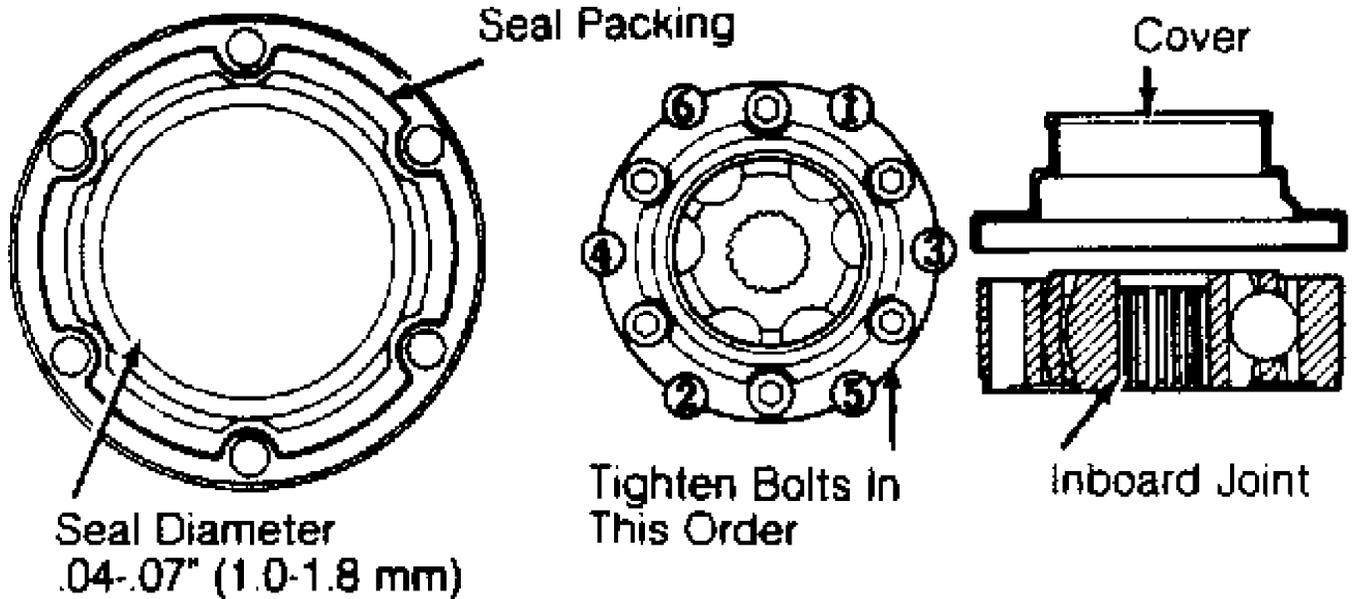


Fig. 15: Tightening Inboard CV Joint Cover
Courtesy of Toyota Motor Co., U.S.A., Inc.

5) Use a brass drift and hammer to tap the inboard joint assembly onto the drive shaft. Brass drift should only contact INNER race during installation. Install a new snap ring over inner race.

6) Pack outboard joint with grease supplied in boot kit. Pack inboard CV joint and boot with grease.

7) Set axle shaft to standard length and ensure boots are not contracted or stretched. See Fig. 12. See TOYOTA AXLE SHAFT LENGTH table for correct dimensions. Install and tighten inner and outer clamps. Inboard joint should slide smoothly in thrust direction.

Disassembly (Celica W/3S-GE Engine)

1) Remove inboard joint boot clamps and slide back boot. Place mating marks on inboard joint outer race and drive shaft. Pry out snap ring from inboard joint outer race.

NOTE: Manufacturer does not recommend disassembling outboard CV joint.

2) Slide inboard joint outer race from drive shaft. Use paint to place mating marks on drive shaft, cage and inner race. Remove the 6 balls from inner race.

3) Remove snap ring that retains inner race to axle shaft. Using a brass drift and hammer, drive inner race from axle shaft. Remove snap ring and slide off inboard boot.

Reassembly

1) Wrap axle shaft splines with vinyl tape to protect boot from damage during reassembly. Slide new boots onto axle shaft.

Install NEW retaining snap ring on inboard joint.

2) Slide ball cage over drive shaft with large end of cage facing inboard side of shaft. Align match marks made during disassembly and tap inner race onto shaft using brass drift and hammer. Install snap ring to retain inner race.

3) Place ball cage over inner race and install balls. Use grease to hold balls in position.

4) On the outboard joint, pack boot with new grease supplied with overhaul kit. Pack inboard outer race and boot with grease. Align match marks made during disassembly and install outer race on drive shaft.

5) Install NEW snap ring into inside diameter of outer race. Place boot over inboard outer race. Place clamps over boots, but do not tighten yet.

6) Set axle shaft to standard length and ensure boots are not contracted or stretched. See Fig. 12. See TOYOTA AXLE SHAFT LENGTH table for correct dimensions. Install and tighten inner and outer clamps. Inboard joint should slide smoothly in thrust direction.

TOYOTA AXLE SHAFT LENGTH TABLE

Application	Length (1) In. (mm)
Camry	17.5-17.7 (445.7-450.7)
Camry All-Trac & V6	
Both Sides	15.9 (406.0)
Celica	
3S-FE Engine	17.4 (445.3)
3S-GE/GTE Engine	
Left Side	18.1 (459.3)
Right Side	18.2 (461.8)
Celica All-Trac	
Both Sides	15.8 (400.6)
Corolla	
4A-GE Engine	
Right Side	27.5-27.9 (699.2-709.2)
Left Side	16.5-16.7 (418.8-428.8)
4A-F Engine	
Right Side	32.9-33.4 (837.7-847.7)
Left Side	20.6-20.9 (523.2-533.2)
Corolla FX	
4A-C Engine & 4A-GE Engine W/Auto. Trans.	
Right Side	27.3-27.7 (693-703)
Left Side	16.3-16.7 (415-425)
4A-GE Engine W/Man. Trans.	
Right Side	27.4-27.8 (695-705)
Left Side	16.3-16.7 (415-425)
Pickup & 4Runner	
Both Sides	15.5-15.9 (393.9-403.9)
Tercel Sedan	
Right Side	30.7-31.1 (779.4-789.4)
Left Side	21.6-22.0 (549.1-559.1)
Tercel Wagon	
Right Side	24.4 (620)
Left Side	28.4 (722)
Van (4WD)	
Both Sides	14.8-14.9 (376.5-379.5)

(1) - Axle shaft length not provided for models not listed.

Installation (All Models)

1) To install drive axle shaft, reverse removal procedure. If

side gear shaft was removed, install a NEW side gear shaft retainer ring. Ensure side gear shaft end play is the same as that measured during removal. Normal side gear shaft end play is .080-.120" (2-3 mm).

2) Check seals at both ends of axle shaft and replace prior to installation if necessary. Lubricate transaxle seal lip with transaxle oil.

3) Install axle shaft into transaxle case. On all models with snap ring retained axle shafts, always use NEW snap ring. Try to pull axle shaft out of differential by hand to ensure proper engagement of snap ring. Install axle shafts into wheel hub. Align suspension marks made at removal and tighten nuts.

4) Check camber setting and adjust if necessary. Stake axle shaft nut in place with a punch or install new cotter pin after tightening. Bleed brake system (if caliper was removed). Refill transaxle fluid (if required).

NOTE: For illustrations of free-wheeling locking hubs, see LOCKING HUBS article in this section.

Freewheeling Hub Installation (Pickup, 4Runner & 4WD Van)

1) On manual locking hubs, install hub body with new gasket on front axle hub. Install and tighten 6 cone washers and nuts.

2) Install center bolt and washer. Apply grease to inner hub splines. Place hub in "FREE" position. Using new gasket, install hub cover with follower pawl tabs aligned with non-toothed portions of body. Tighten cover mounting bolts.

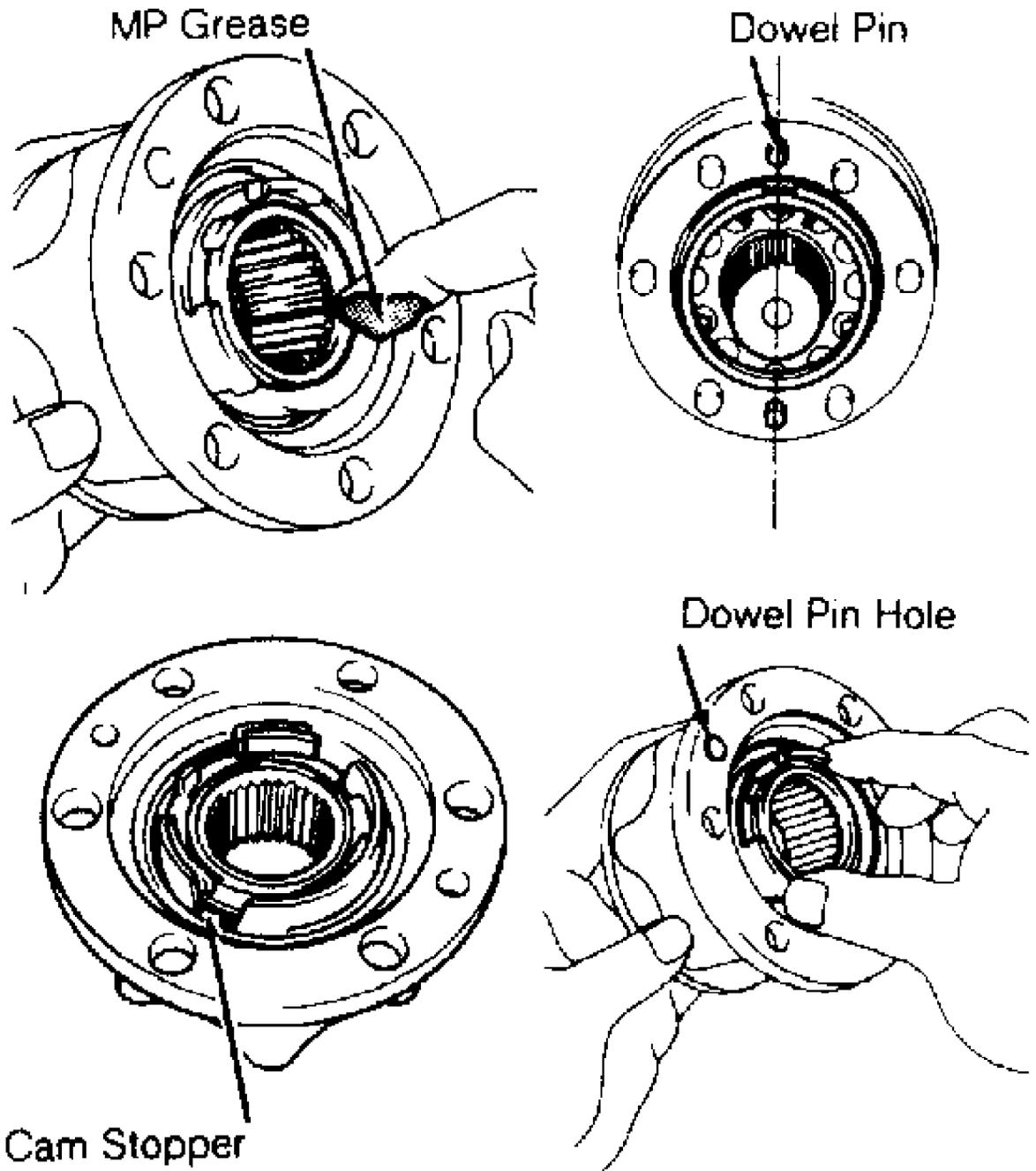
3) On automatic locking hubs, install a new gasket on the axle hub. Apply grease on the locking hub body inner splines. Align the brake assembly spring ends with the dowel pin. See Fig. 16.

4) On locking hub body, ensure outer cam stopper is securely in inner cam groove. Position inner cam protrusion so it is centered between the outer cam protrusions and aligned with the dowel pin hole of the hub body.

5) Install automatic locking hub on axle hub so inner cam protrusion is set between end of the brake spring. Locking hub body and drive shaft splines must be aligned. Ensure body fits squarely on axle hub. Install and tighten 6 cone washers and nuts to 23 ft. lbs. (31 N.m).

6) Install center bolt and washer. Install new gasket, hub cover and retaining screws.

CAUTION: After installation of automatic locking hubs, left and right side hubs may not lock at same time. Drive vehicle in "H4" for short distance to synchronize hubs.



Outer Cam Stopper

Fig. 16: Pickup & 4Runner Automatic Locking Hub
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

TORQUE SPECIFICATIONS (TOYOTA) TABLE

Application	Ft. Lbs. (N.m)
Camry, Celica, Corolla & FX Axle Shaft Flange-to-Side Gear Flange Nuts	
Camry, Celica, Corolla & FX	27 (36)
Camry All-Trac & V6	48 (65)

Axle Shaft Hub Nut	137 (186)
Brake Caliper Bolt	
Corolla & FX	65 (88)
Center Bearing Lock Bolt (1)	24 (32)
Lower Ball Joint-to-Steering Knuckle Bolts/Nuts	
Camry & All-Trac, Celica	94 (127)
Camry V6	83 (113)
Corolla	47 (64)
Tie Rod End	
Camry	41 (56)
Camry All-Trac & V6, Celica	36 (49)
Pickup, 4Runner & 4WD Van	
Axle Shaft-to-Differential Drive	
Flange Nuts	61 (83)
Freewheel Hub Body-to-Axle Hub	23 (31)
Freewheel Hub Body Center Bolt	13 (18)
Tercel	
Axle Shaft Hub Nut	137 (186)
Disc Brake Caliper Bolt	65 (88)
Steering Knuckle-to-Shock Absorber Bolt	166 (226)
Tie Rod End Nut	36 (49)
	INCH Lbs. (N.m)
Pickup, 4Runner & 4WD Van	
Freewheel Hub Cover-to-Hub	
Body Bolts	84 (10)

(1) - Always use new lock bolt.
