

1999 Toyota RAV4

1999-2000 DRIVE AXLES AWD & FWD Axle Shafts - RAV4 & RWD Axle Shafts - MR2

1999-2000 DRIVE AXLES

AWD & FWD Axle Shafts - RAV4 & RWD Axle Shafts - MR2

DESCRIPTION & OPERATION

On RAV4 models, axle shafts transfer power from transaxle to front wheels (FWD), or front and rear wheels (AWD). MR2 are a mid-engine, RWD design. Axle shafts transfer power from transaxle to rear wheels. Axle shaft consists of axle shaft with flexible Constant Velocity (CV) joint at each end. On RAV4 models, front inner CV joint is splined to transaxle. Rear inner CV joint is bolted to differential. Outer CV joint is splined to front or rear hub assembly. On MR2 models, rear inner CV joint is splined to transaxle and Outer CV joint is splined to rear hub assembly.

Inner and outer CV joints are enclosed by a CV joint boot. Boot maintains lubrication in CV joint and prevents contamination of CV lubricant. Boots must be replaced if cracked, torn or damaged. Inner CV joint can be repaired without replacing assembly but outer CV joint must be replaced as an assembly.

TROUBLE SHOOTING

NOTE: See DRIVE AXLE NOISE DIAGNOSIS article in GENERAL INFORMATION.

REMOVAL & INSTALLATION

FRONT AXLE SHAFTS

NOTE: DO NOT damage oil seal, axle shaft boots or Anti-Lock Brake System (ABS) speed sensor rotor when removing axle shaft.

Removal (RAV4)

1. Raise and support vehicle. Remove front wheel. Remove engine undercover. Drain gear oil from transaxle into proper container. Remove ABS speed sensor (if equipped). Remove cotter pin and lock cap. See **Fig. 1** or **Fig. 2** . Apply brakes, and remove axle shaft nut from end of axle shaft. Release brakes.
2. Remove cotter pin and nut from tie rod end. Using Tie Rod End Remover (SST 09610-20012), disconnect tie rod end from steering knuckle. Disconnect stabilizer bar link from lower suspension arm. Remove bolt and 2 nuts, and separate lower ball joint from suspension arm.
3. Using a plastic hammer, tap axle shaft from hub. Pull steering knuckle outward, and disconnect axle shaft from steering knuckle.

NOTE: On FWD vehicles, removal of right-side axle shaft requires disassembly of center bearing axle support. See **Fig. 3** or **Fig. 4** .

4. To remove axle shaft (except left side on AWD), use a brass drift and hammer and tap on inner joint to separate from transaxle. Slide axle shaft toward steering knuckle until free of transaxle assembly.

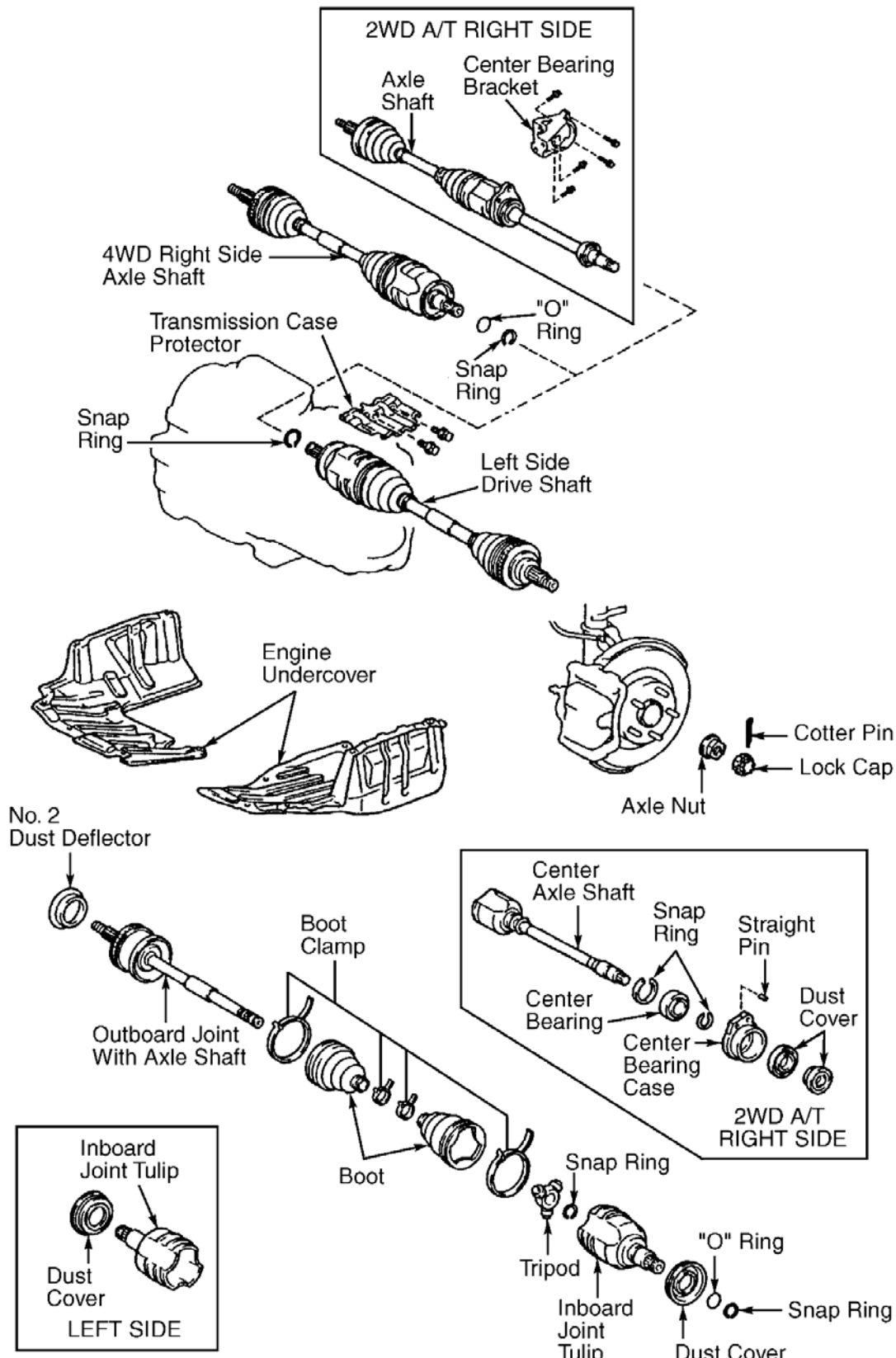
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5. To remove left-side axle shaft on AWD, remove air cleaner and transaxle case protector. Using an appropriate pry bar, pry axle from transaxle assembly. See **Fig. 5** . Slide axle shaft toward steering knuckle until free of transaxle assembly.

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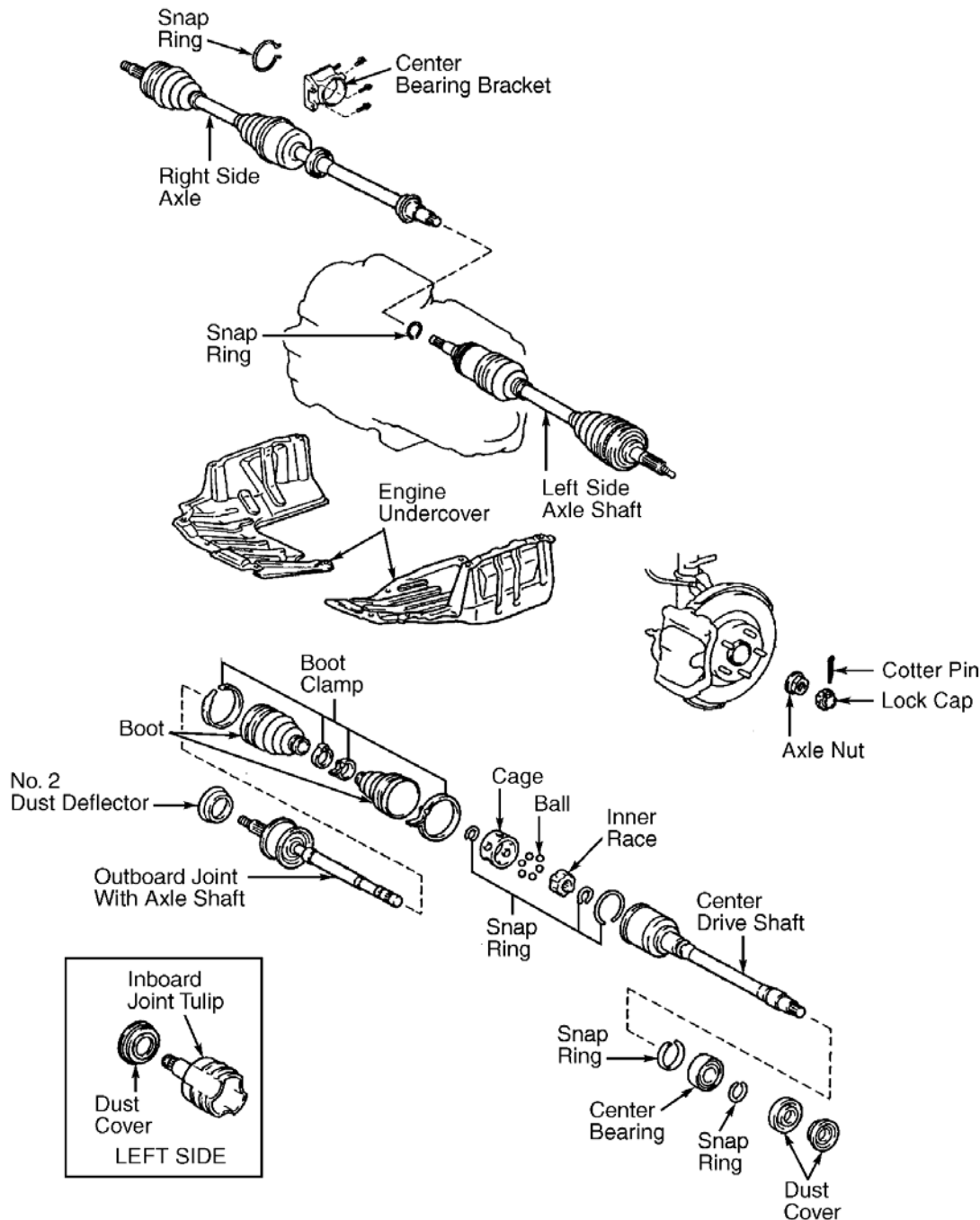


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Fig. 1: Exploded View Of Front Axle Shaft (FWD A/T & AWD)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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Fig. 2: Exploded View Of Front Axle Shaft (FWD M/T)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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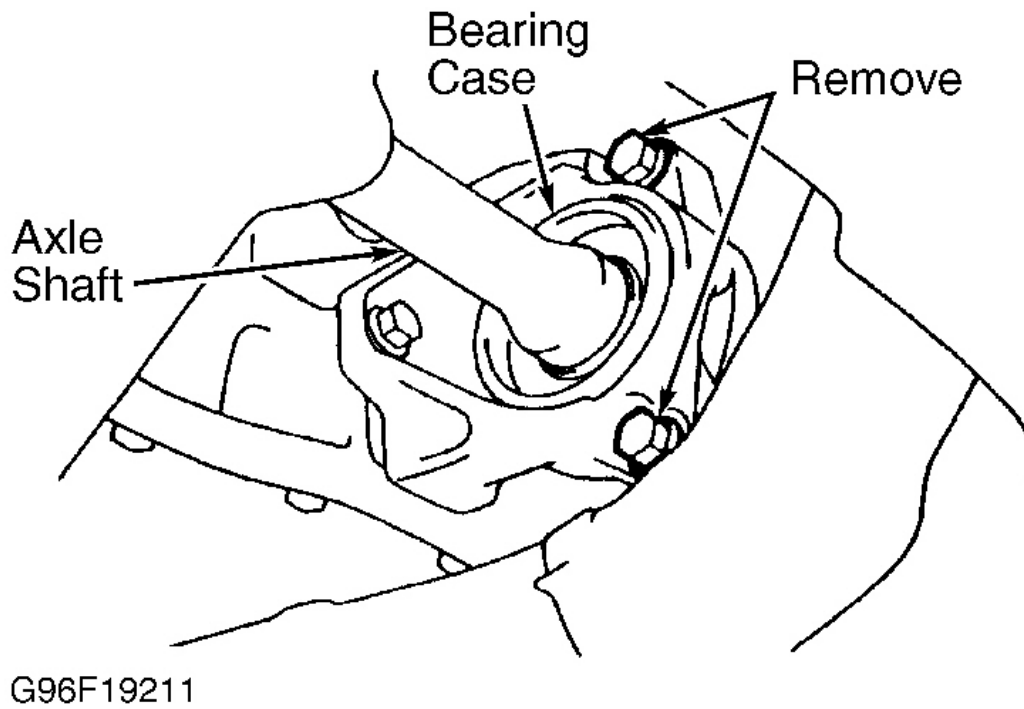
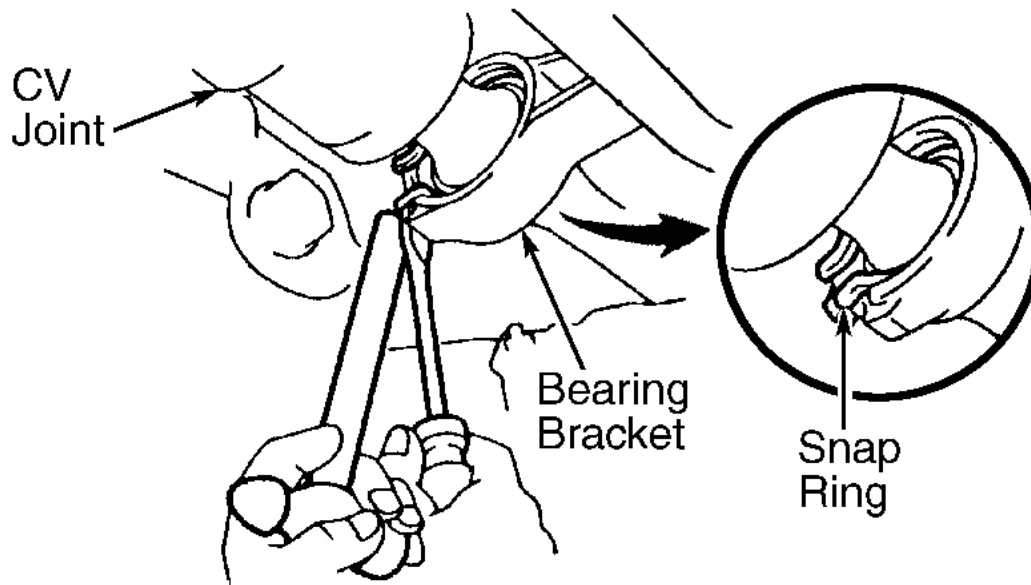


Fig. 3: Disassembling Center Bearing Axle Shaft Support (FWD A/T)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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Fig. 4: Disassembling Center Bearing Axle Shaft Support (FWD M/T)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

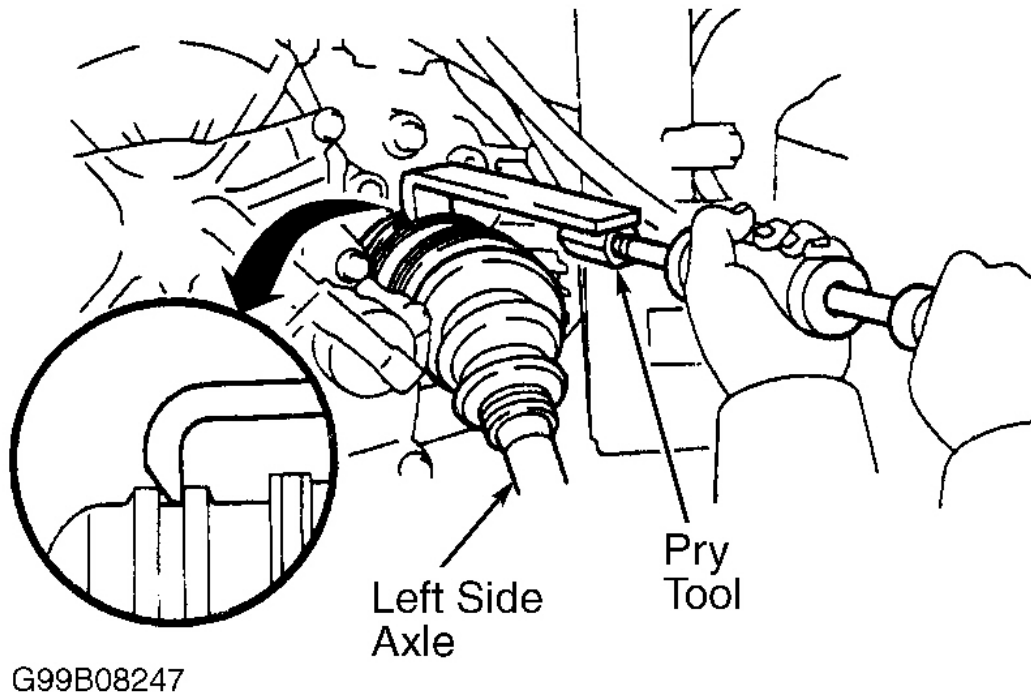


Fig. 5: Removing Left-Side Axle Shaft (AWD)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Inspection

Ensure no play exists in inner and outer joints. Inner joint must slide smoothly inward and outward, and be free from excessive play in radial direction. Check for torn or damaged boots.

Disassembly (FWD A/T & AWD)

NOTE: Manufacturer does not recommend overhaul of outer joint assembly.

1. Remove boot clamps and slide boots from joints. Paint reference marks on outer race and axle shaft for reassembly reference. See **Fig. 6**.
2. Remove outer joint tulip (or center driveshaft) from inboard tripod joint and axle shaft. Remove snap ring from end of axle shaft retaining inboard tripod joint. Paint reference marks on tripod joint and axle shaft for reassembly reference.
3. Using a hammer and brass drift, tap inboard tripod joint from axle shaft. DO NOT tap on roller of tripod joint during removal. Remove boots from axle shaft. Using a press, remove dust cover from right-side axle (FWD). Using a press, remove dust cover from left-side inboard joint tulip (FWD and AWD).
4. On FWD models, disassemble right-side center axle shaft. Using snap ring pliers or a screwdriver, remove snap ring. Using a press, remove bearing from case. Remove straight pin from bearing case with

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pin punch and hammer.

5. Using a press, remove dust cover. Remove snap ring retaining bearing to axle shaft, then press bearing from axle. Using a screwdriver and hammer, remove outer dust deflector from axle shaft.

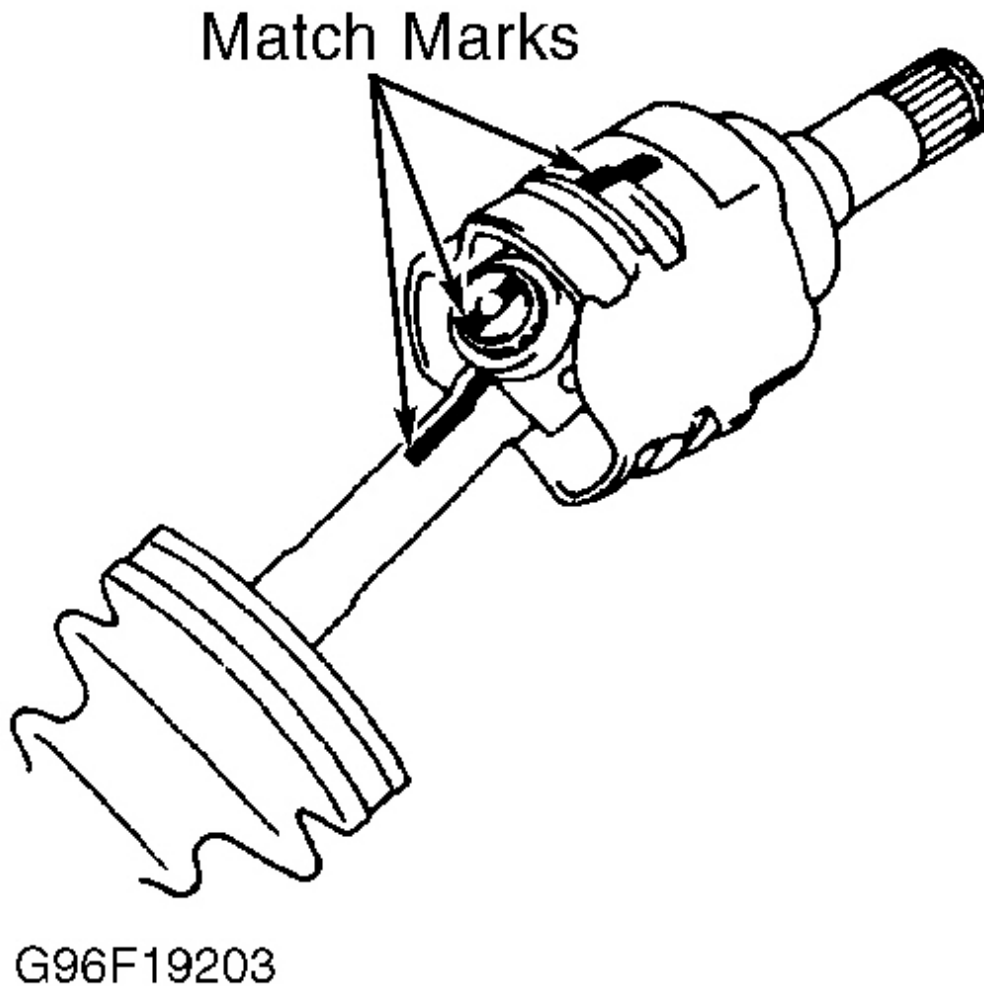


Fig. 6: Match-Marking Components For Reassembly Reference (Typical)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Reassembly

1. Using a press, install NEW dust deflector onto axle shaft. Using a pin punch and hammer, install straight pin into bearing case. Using a press, install NEW bearing into bearing case. Install snap ring.

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2. Using a press, install bearing assembly on axle shaft. Install NEW snap ring. Press NEW dust cover against bearing, leaving .039" (1.0 mm) between bearing and dust cover.
3. Using a press, install NEW dust cover onto axle shaft. Right-side (transaxle side) dust cover must be positioned 3.39-3.43" (86.0-87.0 mm) from end of axle shaft. Wrap splines on axle shaft with tape to prevent damaging boots during installation. Install NEW boots and NEW boot clamps onto axle shaft.
4. Apply grease supplied with overhaul kit to outboard joint and boot. Install boot and boot clamps onto outboard joint.
5. Install inboard tripod joint onto axle shaft, with reference mark aligned. Using a hammer and brass drift, drive on inner race until fully seated on axle shaft. DO NOT allow brass drift to contact cage on inboard tripod joint during installation.
6. Install NEW snap ring on end of axle shaft. Apply grease supplied with overhaul kit into inboard joint housing and boot.
7. Install boot on inboard joint cover. Ensure boots are seated in grooves on axle shaft. Adjust axle shaft to standard axle shaft length. See **AXLE SHAFT LENGTH SPECIFICATIONS** . See **Fig. 7** . Install and tighten boot clamps.

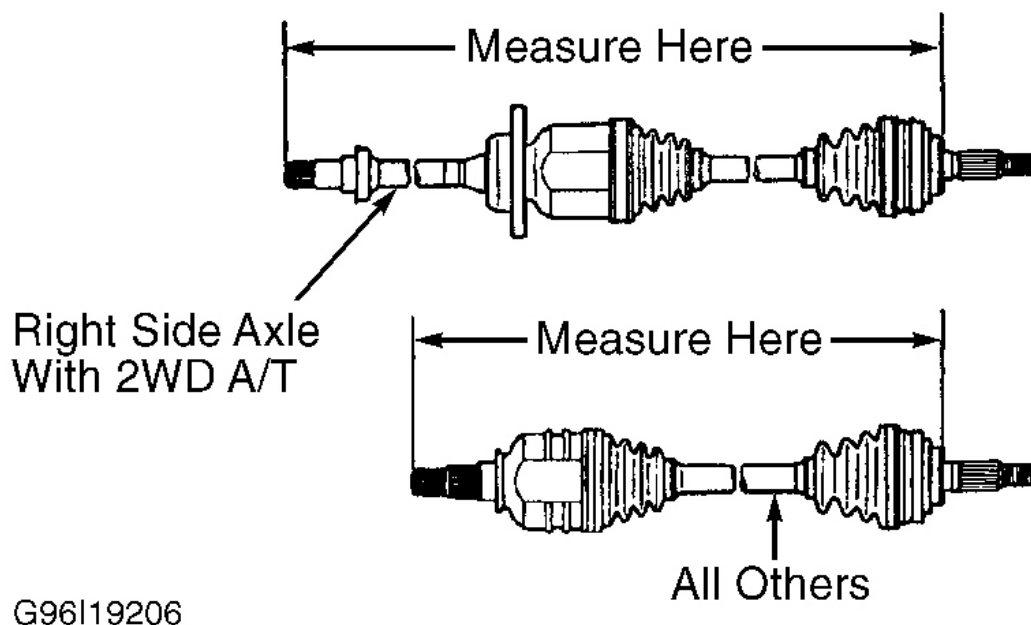


Fig. 7: Measuring Axle Shaft Length (Front)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Installation

1. To install, reverse removal procedure. Before installing axle shafts, install NEW snap ring on end of axle shaft (except right side on FWD). Coat axle shaft seals in transaxle with grease. Coat axle shaft splines

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and sliding surfaces with Dexron-II. Position snap ring on end of axle shaft, with opening facing downward.

2. Install axle shaft by lightly tapping axle shaft into transaxle. Ensure axle shaft will move inward and outward approximately .079-.120" (2.00-3.00 mm), and cannot be pulled from transaxle.
3. To install remaining components, reverse removal procedure. Tighten remaining bolts/nuts to specification. See **TORQUE SPECIFICATIONS** . Fill transaxle with Dexron-II (A/T models), or 75W-90 gear oil with API GL-3, GL-4 or GL-5 rating (M/T models).

Disassembly (FWD M/T)

NOTE: **Manufacturer does not recommend overhaul of outer joint assembly.**

1. Remove boot clamps, and slide boots from joints. Paint reference marks on outer race and axle shaft for reassembly reference. See **Fig. 6** .
2. Using a screwdriver, remove snap ring from outer tulip race. Remove outer tulip race from inner joint and axle shaft. Remove snap ring from end of axle shaft retaining inner joint. Paint reference marks on inner joint, outer cage and axle shaft for reassembly reference.
3. Remove 6 balls and cage. Using a hammer and brass drift, tap inner joint from axle shaft. Remove inner snap ring. Remove boots from axle shaft. Using a press, remove dust cover from right-side axle shaft. Using a press and bearing splitter, remove dust cover from left-side inner joint tulip.
4. Disassemble right-side center axle shaft. Using snap ring pliers or a screwdriver, remove snap ring. Using a press, remove bearing from axle. Using a screwdriver and hammer, remove outer dust deflector from axle shaft.

Reassembly

1. Using a press, install NEW dust deflector on outboard end of axle shaft. Install NEW snap ring, then press center bearing on axle shaft. Press NEW dust cover against bearing. On FWD M/T models, clearance should be .039" (1.0 mm) between bearing and dust cover. On FWD A/T and AWD models, clearance should be 3.39-3.43" (86-87 mm) between bearing and dust cover.
2. Using a press, install NEW dust cover on axle shaft. Right-side (transaxle side) dust cover must be positioned 4.134-4.173" (105.0-106.0 mm) from end of axle shaft. Wrap splines on axle shaft with tape to prevent damaging boots during installation.
3. Install NEW boots and NEW boot clamps on axle shaft. Install NEW snap ring on axle shaft. Install inboard joint on axle shaft with small diameter side facing outboard joint. Ensure reference mark on inner joint and axle shaft are aligned. Install NEW snap ring that retains inner joint on axle shaft.
4. Position outer cage and 6 balls on inner joint, and hold in place with grease. Apply grease supplied with overhaul kit to inner joint and boot. Install inboard joint tulip (center shaft) on inner joint. Ensure match-marks are aligned. Install NEW snap ring.
5. Apply grease supplied with overhaul kit into outer joint and boot. Install boot on inner housing and outer joint. Ensure boots are seated in grooves on axle shaft. Adjust axle shaft to standard axle shaft length. See **AXLE SHAFT LENGTH SPECIFICATIONS** . See **Fig. 7** . Install and tighten boot clamps to a clearance of .047-.157" (1.2-4.0 mm).

Installation

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1. To install, reverse removal procedure. Before installing axle shafts, install NEW snap ring on end of axle shaft (except right side). Coat axle shaft seals in transaxle with grease. Coat axle shaft splines and sliding surfaces with Dexron-II. Position snap ring on end of axle shaft, with opening facing downward.
2. Install axle shaft by lightly tapping axle shaft into transaxle. Ensure axle shaft will move inward and outward approximately .079-.120" (2.00-3.00 mm), and cannot be pulled from transaxle.
3. To install remaining components, reverse removal procedure. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** . Fill transaxle with 75W-90 gear oil with API GL-3, GL-4 or GL-5 rating.

REAR AXLE SHAFTS

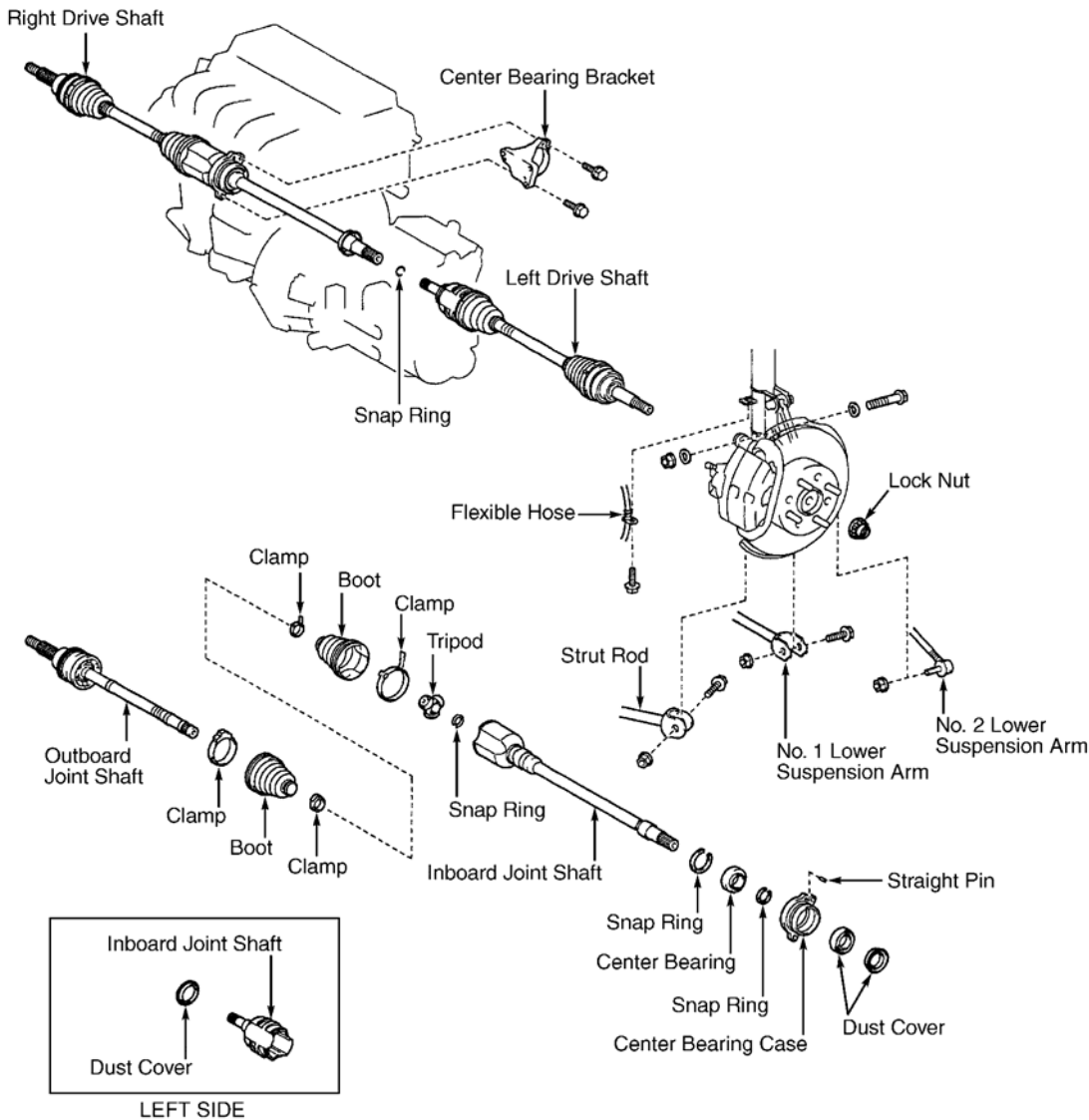
Removal (MR2)

NOTE: **DO NOT damage oil seal, axle shaft boots or Anti-Lock Brake System (ABS) speed sensor rotor when removing axle shaft.**

1. Raise and support vehicle. Remove rear wheels. Remove engine undercovers. Drain differential oil into proper container. Unstake drive shaft lock nut. Apply brakes and remove nut. Remove bolt and brake flex hose bracket from shock absorber. Loosen 2 lower shock absorber bolts and nuts.
2. Remove mounting bolts/nuts and disconnect strut rod from axle carrier. Remove mounting bolts/nuts from No. 1 lower suspension arm. Remove nut and No. 2 lower suspension arm. Remove 2 lower shock absorber bolts and nuts. See [Fig. 8](#) . Using plastic hammer, remove drive shaft from axle hub. DO NOT damage oil seal, boots or dust seal.

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Fig. 8: Exploded View Of Rear Axle Shaft (MR2)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Inspection

Ensure no play exists in inner and outer joints. Inner joint must slide smoothly inward and outward, and be free from excessive play in radial direction. Check for torn or damaged boots.

Disassembly

NOTE: Manufacturer does not recommend overhaul of outer joint assembly.

1. Remove boot clamps and slide boots from joints. Paint reference marks on outer race and axle shaft for

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reassembly reference.

2. Remove outer race from inboard tripod joint and axle shaft. Remove snap ring from end of axle shaft that retains inboard tripod joint. Paint reference marks on tripod joint and axle shaft for reassembly reference.
3. Using a hammer and brass drift, tap inboard tripod joint from axle shaft. DO NOT tap on roller of tripod joint during removal. Remove boots from axle shaft. Using a screwdriver and hammer, remove dust deflector from axle shaft.

Reassembly

1. Using a press, install NEW dust deflector on left side axle shaft. Wrap splines on axle shaft with tape to prevent damaging boots during installation. Using a punch and hammer, install straight pin onto center bearing case on right side axle shaft. Press center bearing into bearing case. Install center bearing and bearing case assembly to inboard joint shaft. Right side dust cover must be positioned so there is .039" (1.0 mm) between dust cover and bearing assembly.
2. Install NEW boots and NEW boot clamps on axle shaft. Install NEW snap ring on axle shaft. Install inboard tripod joint on axle shaft, with small diameter side facing outboard joint. Ensure reference mark on inboard joint and axle shaft are aligned. Install NEW snap ring that retains inboard tripod joint on axle shaft.
3. Apply grease supplied with overhaul kit to inner joint and boot. Install outer joint tulip on inner joint. Ensure match-marks are aligned.
4. Apply grease supplied with overhaul kit into outer joint and boot. Install boot on inner housing and outer joint. Ensure boots are seated in grooves on axle shaft. Adjust axle shaft to standard axle shaft length. See **AXLE SHAFT LENGTH SPECIFICATIONS** . See **Fig. 9** . Install and tighten boot clamps.

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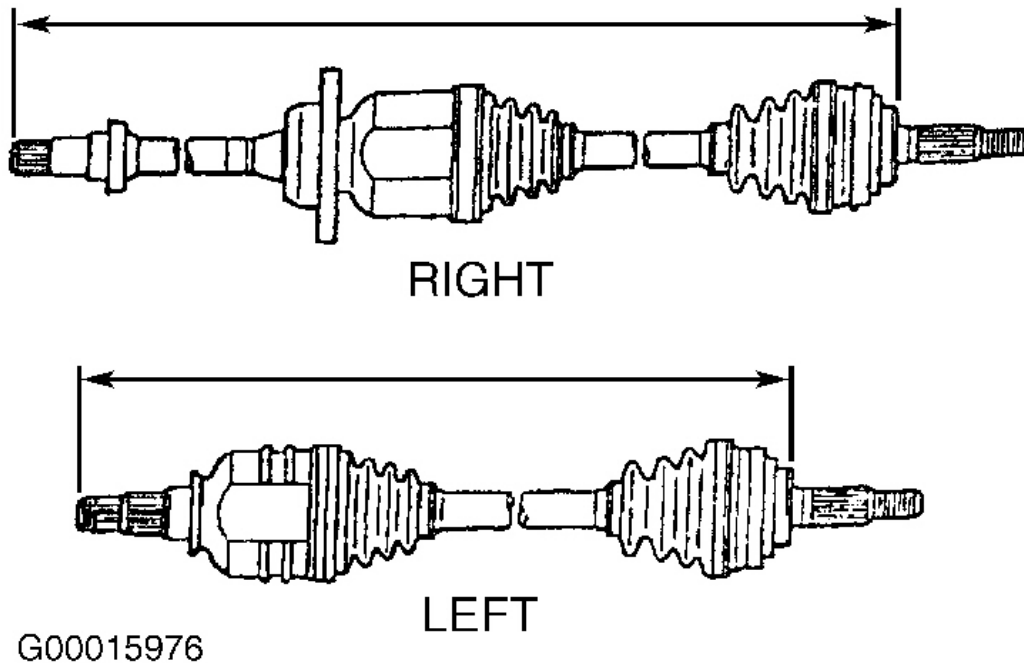


Fig. 9: Measuring Axle Shaft Length (Rear)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Installation

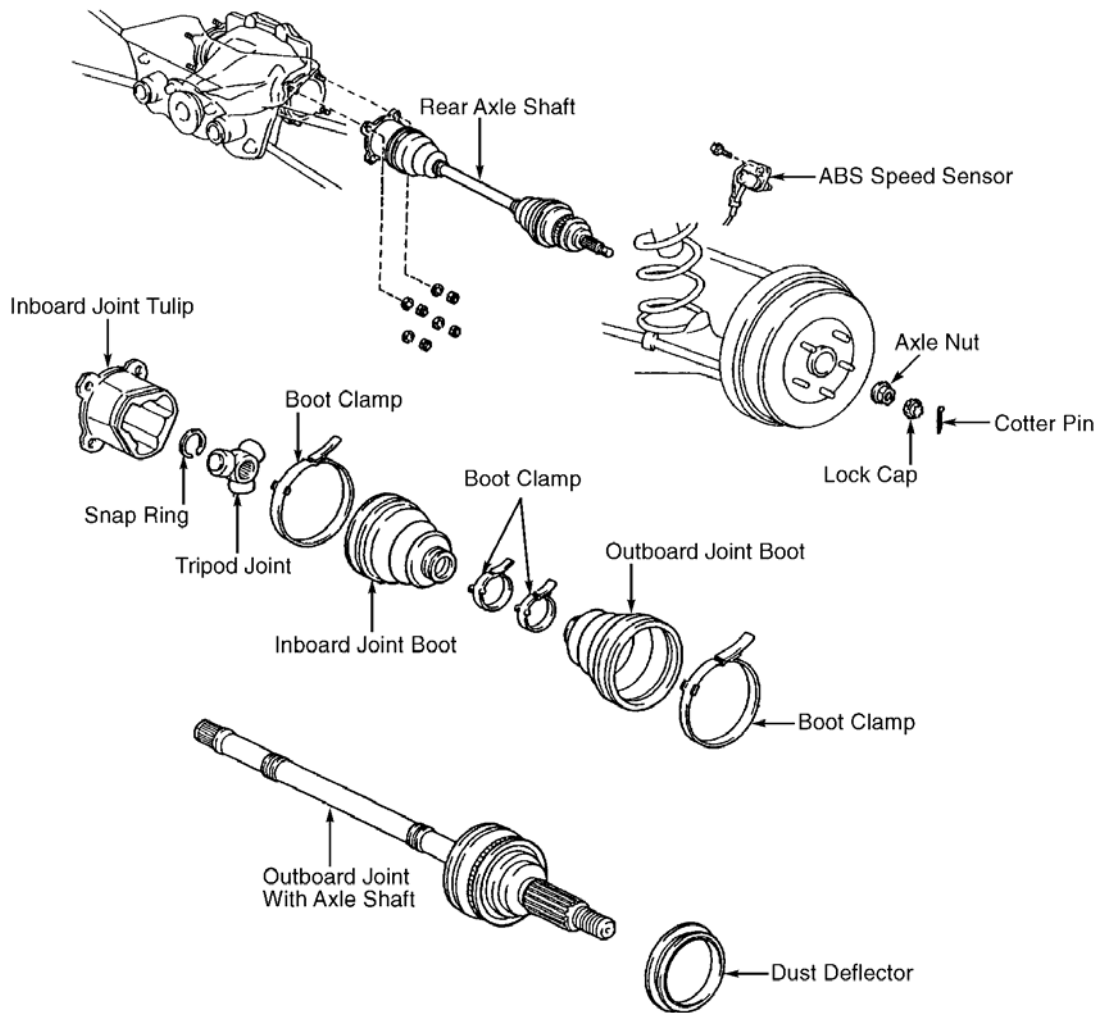
To install, reverse removal procedure. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** . After installation, check ABS speed sensor signal and wheel alignment.

Removal RAV4

1. Raise and support vehicle. Remove rear wheels. Drain differential oil into proper container. Remove ABS speed sensor (if equipped). Remove cotter pin and lock cap. Apply brakes and remove nut.
2. Place match-marks on axle shaft flange and differential flange for installation reference. Remove 4 nuts and washers. Using a plastic hammer, tap axle shaft from rear hub. Remove rear axle. See **Fig. 10** .

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Fig. 10: Exploded View Of Rear Axle Shaft (AWD)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Inspection

Ensure no play exists in inner and outer joints. Inner joint must slide smoothly inward and outward, and be free from excessive play in radial direction. Check for torn or damaged boots.

Disassembly

NOTE: Manufacturer does not recommend overhaul of outer joint assembly.

1. Remove boot clamps and slide boots from joints. Paint reference marks on outer race and axle shaft for reassembly reference.
2. Remove outer race from inboard tripod joint and axle shaft. Remove snap ring from end of axle shaft

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retaining inboard tripod joint. Paint reference marks on tripod joint and axle shaft for reassembly reference.

3. Using a hammer and brass drift, tap inboard tripod joint from axle shaft. DO NOT tap on roller of tripod joint during removal. Remove boots from axle shaft. Using a screwdriver and hammer, remove dust deflector from axle shaft.

Reassembly

1. Using a press, install NEW dust deflector on axle shaft. Wrap splines on axle shaft with tape to prevent damaging boots during installation.
2. Install NEW boots and NEW boot clamps on axle shaft. Install NEW snap ring on axle shaft. Install inboard tripod joint on axle shaft, with small diameter side facing outboard joint. Ensure reference mark on inboard joint and axle shaft are aligned. Install NEW snap ring that retains inboard tripod joint on axle shaft.
3. Apply grease supplied with overhaul kit to inner joint and boot. Install outer joint tulip on inner joint. Ensure match-marks are aligned.
4. Apply grease supplied with overhaul kit into outer joint and boot. Install boot on inner housing and outer joint. Ensure boots are seated in grooves on axle shaft. Adjust axle shaft to standard axle shaft length. See **AXLE SHAFT LENGTH SPECIFICATIONS** . See **Fig. 11** . Install and tighten boot clamps.

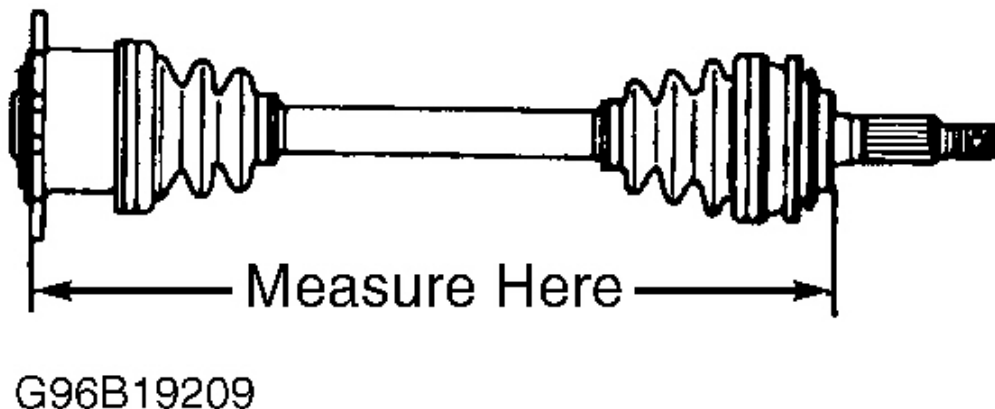


Fig. 11: Measuring Axle Shaft Length (Rear)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Installation

To install, reverse removal procedure. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** . After installation, check ABS speed sensor signal and wheel alignment.

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AXLE SHAFT LENGTH SPECIFICATIONS

FRONT AXLE SHAFT LENGTH SPECIFICATIONS (FWD A/T & AWD)

Application	In. (mm)
2WD A/T ⁽¹⁾	
Left Side	21.40-21.80 (543.50-553.50)
Right Side	33.05-33.45 (839.60-849.60)
4WD ⁽¹⁾	
Left Side	19.80-20.197 (503.00-513.00)
Right Side	19.93-20.32 (506.22-516.13)
(1) Measure axle shaft length between inner joint flange and outer joint flange. See Fig. 7 .	

FRONT AXLE SHAFT LENGTH SPECIFICATIONS (FWD M/T)

Application	In. (mm)
2WD M/T ⁽¹⁾	
Left Side	21.165-21.559 (537.60-547.60)
Right Side	32.988-33.382 (837.90-847.90)
(1) Measure axle shaft length between inner joint flange and outer joint flange. See Fig. 7 .	

REAR AXLE SHAFT LENGTH SPECIFICATIONS

Application	In. (mm)
MR2 ⁽¹⁾	
Left Side	22.26-22.65 (565.4-570.6)
Right Side	31.85-32.25 (809.1-819.1)
RAV4 ⁽²⁾	
Left Side	21.590-21.984 (548.39-558.39)
Right Side	23.401-23.795 (594.39-604.39)
(1) Measure axle shaft length between inner joint flange and outer joint flange. See Fig. 9 .	
(2) Measure axle shaft length between inner joint flange and outer joint flange. See Fig. 11 .	

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
MR2	
ABS Speed Sensor Bolt	(1)
Axle Shaft Nut	159 (216)
Brake Flex Hose Bracket Bolt	21 (29)

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Center Bearing Bracket Bolt	47 (64)
No. 1 Lower Suspension Arm Bolt/Nut	76 (103)
No. 2 Lower Suspension Arm Bolt/Nut	36 (49)
Shock Absorber Nut (Lower)	128 (173)
Strut Rod Bolt/Nut	58 (78)
Wheel Lug Nut	76 (103)
RAV4	
ABS Speed Sensor Bolt	(1)
Axle Shaft Flange Bolt	41 (56)
Axle Shaft Nut	
Front	159 (216)
Rear	159 (216)
Bearing Bracket Bolt	47 (64)
Lower Control Arm-To-Ball Joint Bolt/Nut	94 (127)
Stabilizer Bar Link-To-Lower Control Arm Nut	
2-Door	33 (45)
4-Door	54 (73)
Tie Rod End Nut	36 (49)
Wheel Lug Nut	76 (103)
(1) Tighten bolt to 69 INCH lbs. (7.8 N.m).	