

CLUTCH

1996 Toyota Supra

1995-96 Clutch

Supra

DESCRIPTION

The single, dry-type disc clutch uses a hydraulically-operated master cylinder with a clutch release cylinder mounted on clutch housing. Clutch release cylinder is nonadjustable. The clutch start system uses a clutch start switch which prevents the engine from starting unless clutch pedal is fully depressed.

ADJUSTMENTS

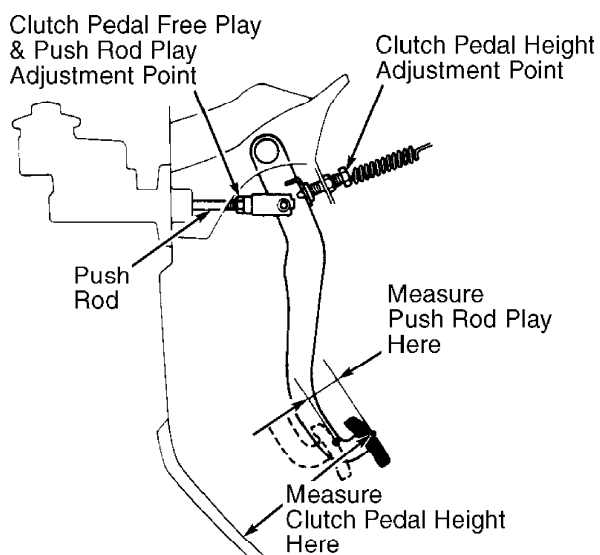
CLUTCH PEDAL HEIGHT

1) Measure clutch pedal height from highest point of clutch pedal pad to floor panel. See Fig. 1. Ensure clutch pedal height is within specification. See CLUTCH PEDAL HEIGHT SPECIFICATIONS table.

2) If clutch pedal height adjustment is required, loosen lock nut and rotate bolt at clutch pedal height adjustment point until correct clutch pedal height is obtained. See Fig. 1. Check clutch pedal free play and push rod play. See CLUTCH PEDAL FREE PLAY & PUSH ROD PLAY.

CLUTCH PEDAL HEIGHT SPECIFICATIONS TABLE

Application	In. (mm)
Supra	5.76-6.15 (146.2-156.2)



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Fig. 1: Clutch Pedal Height, Push Rod Play & Adjustment Points
Courtesy of Toyota Motor Sales, U.S.A., Inc.

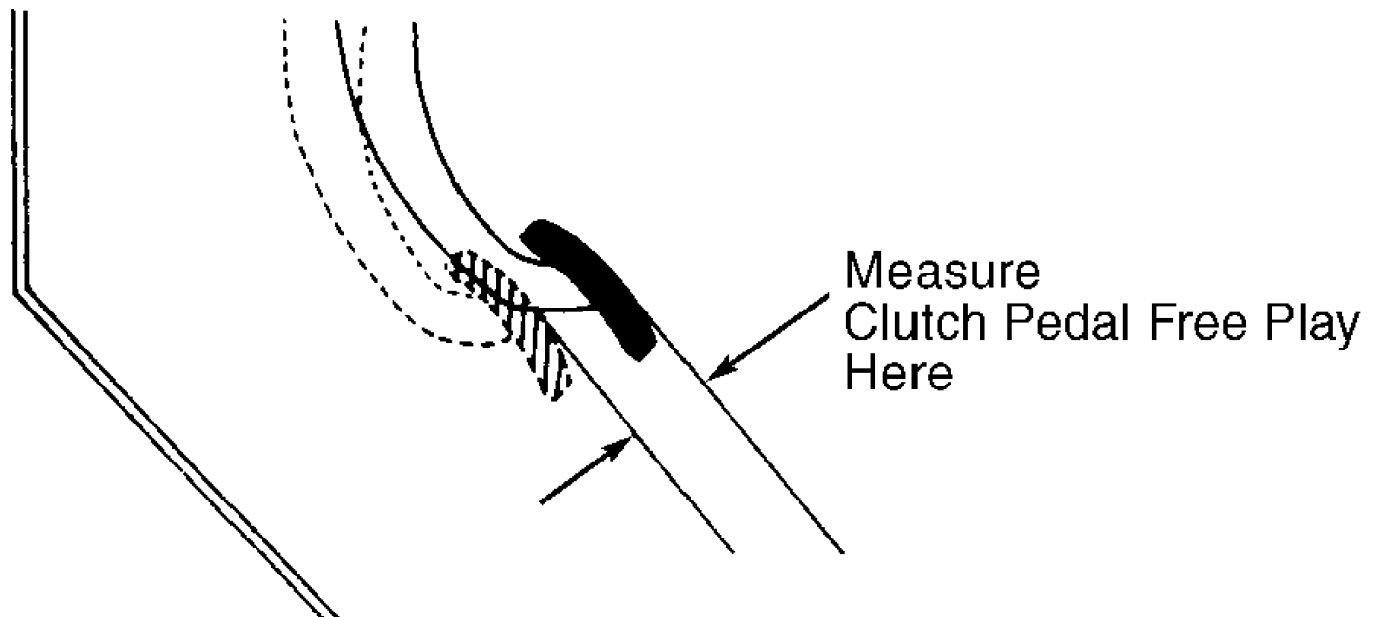
CLUTCH PEDAL FREE PLAY & PUSH ROD PLAY

1) To check clutch pedal free play, push clutch pedal downward until beginning of clutch resistance is felt. See Fig. 2. Note distance clutch pedal moves. This is clutch pedal free play.

2) Clutch pedal free play should be .20-.59" (5.0-15.0 mm). If clutch pedal free play adjustment is required, loosen lock nut on push rod at master cylinder. See Fig. 1. Rotate push rod to obtain correct clutch pedal free play. Tighten lock nut.

3) To check push rod play, slightly push clutch pedal downward until slight resistance is felt (point where push rod just starts to operate clutch master cylinder). See Fig. 1. Push rod play should be .039-.197" (1.00-5.00 mm) at top of clutch pedal. This ensures a slight amount of clearance at push rod.

4) If push rod play adjustment is required, loosen lock nut on push rod at master cylinder. Rotate push rod to obtain correct push rod play. Tighten lock nut. Recheck clutch pedal free play and clutch pedal height.



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Fig. 2: Measuring Clutch Pedal Free Play (Typical)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

TESTING

CLUTCH START SYSTEM

Ensure engine does not start when clutch pedal is released. Ensure engine starts when clutch pedal is fully depressed. If system is not operating correctly, check clutch start switch. See CLUTCH START SWITCH under TESTING. If clutch start switch is okay, adjust clutch start switch for correct system operation.

CLUTCH START SWITCH

1) Disconnect electrical connector from clutch start switch, located near rear of clutch pedal. See Fig. 3. Using an ohmmeter, ensure continuity exists between clutch start switch terminals when clutch pedal is fully depressed (ON position).

2) Ensure continuity does not exist when clutch pedal is

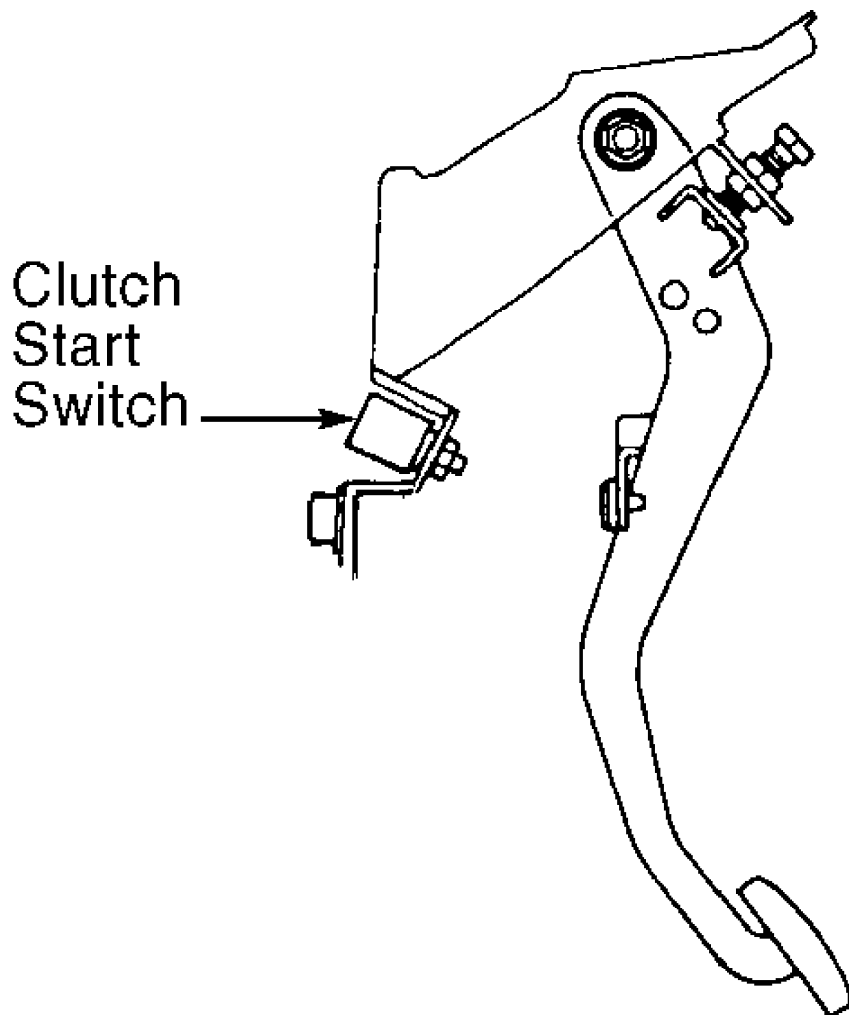
released (OFF position). ON and OFF position is determined by distance that plunger extends from threaded end of clutch start switch. See Fig. 4.

3) For proper distance to determine switch continuity, see CLUTCH START SWITCH PLUNGER CONTINUITY SPECIFICATIONS table. Replace or adjust clutch start switch as necessary. Reinstall electrical connector.

CLUTCH START SWITCH PLUNGER CONTINUITY SPECIFICATIONS (1) TABLE

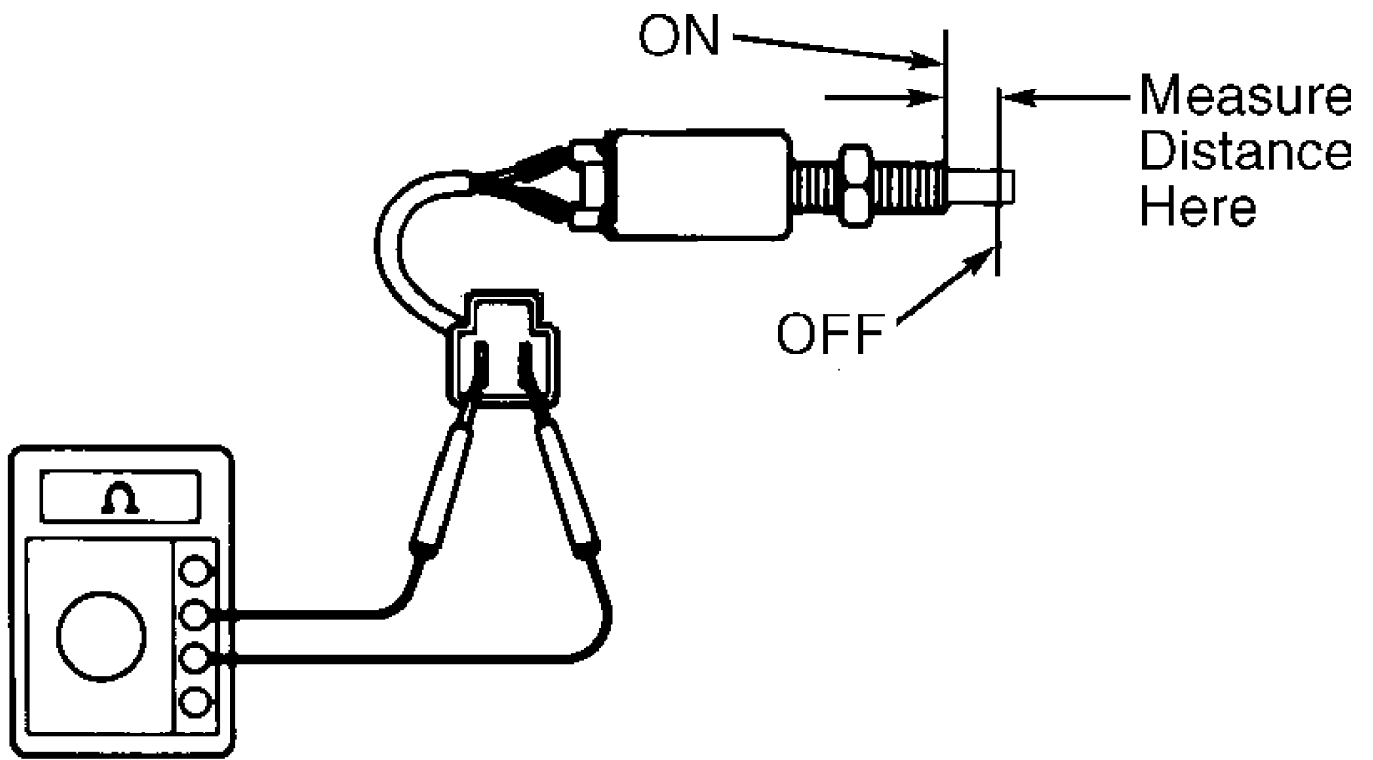
Application	In. (mm)
Supra295-.335 (7.50-8.50)

(1) - Distance from threaded end of clutch start switch where continuity changes. See Fig. 4.



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Fig. 3: Identifying Clutch Start Switch Location (Typical)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.



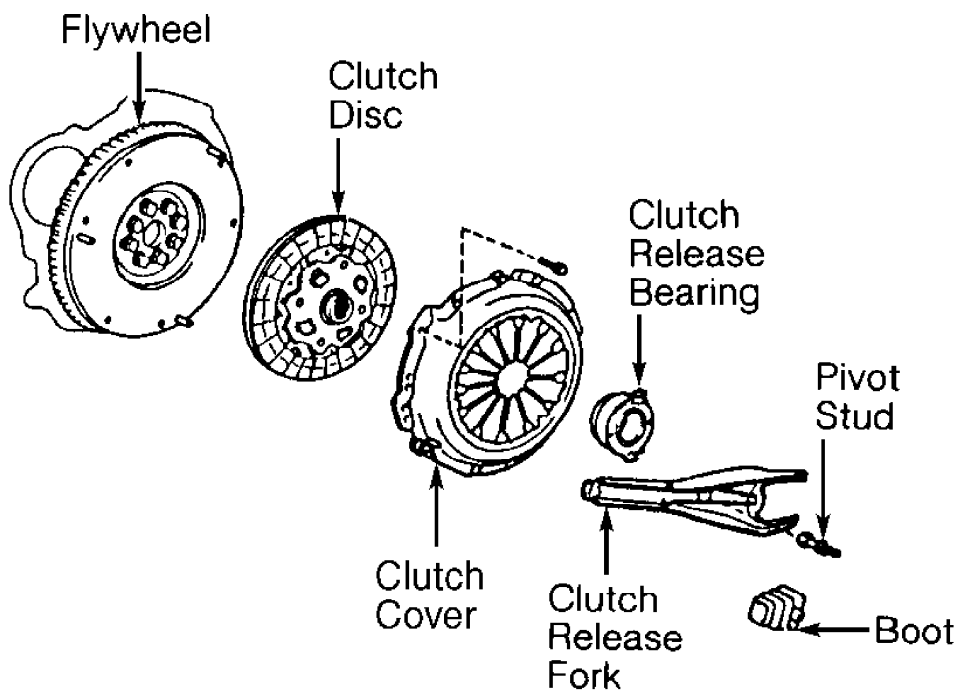
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Fig. 4: Testing Clutch Start Switch
Courtesy of Toyota Motor Sales, U.S.A., Inc.

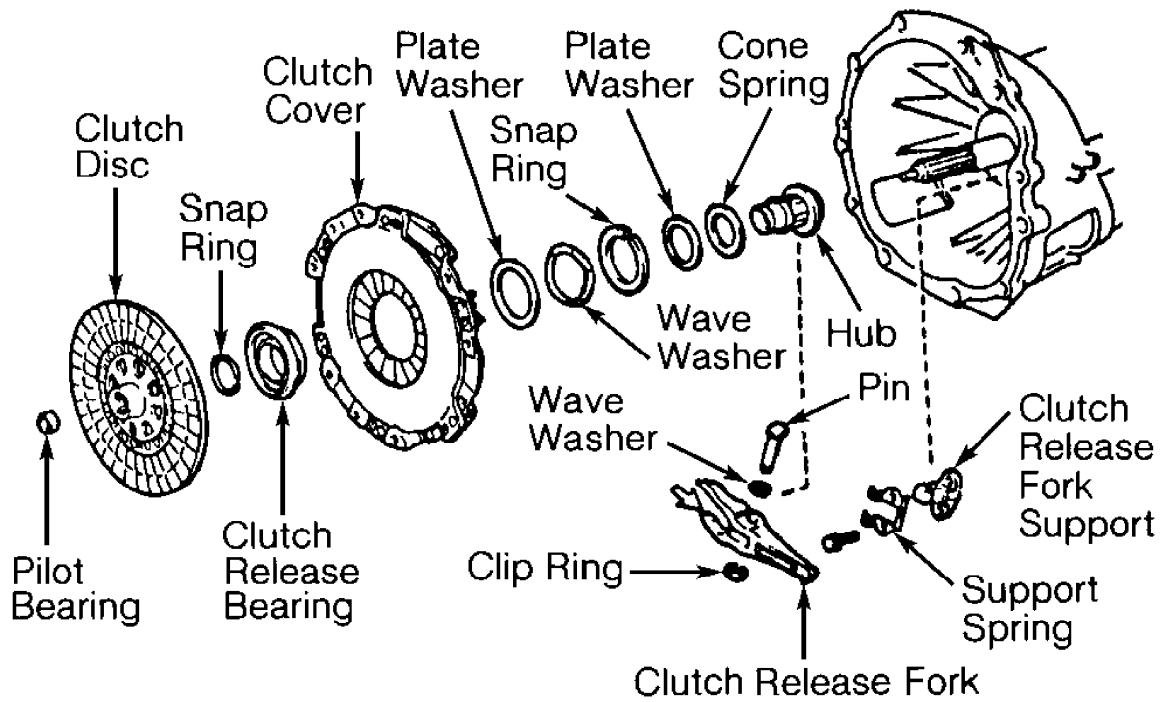
REMOVAL & INSTALLATION

WARNING: To prevent air bag deployment, disconnect negative battery cable and wait at least 90 seconds before working on vehicle.

CLUTCH ASSEMBLY



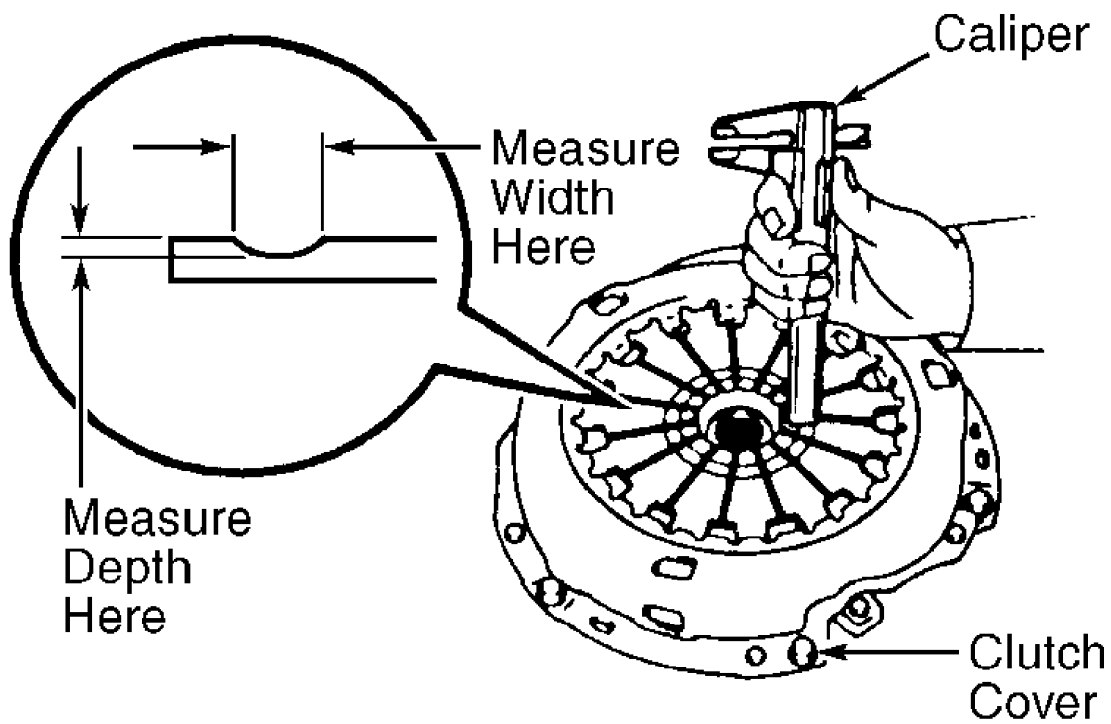
EXCEPT SUPRA TURBO



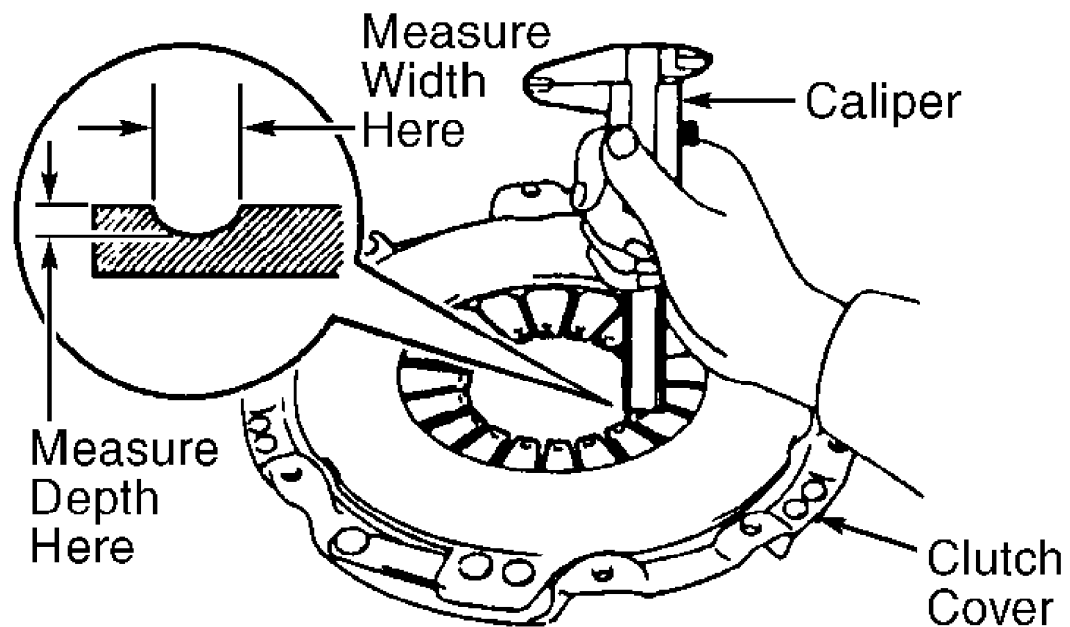
SUPRA TURBO

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Fig. 5: Exploded View Of Clutch Assembly (Typical)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.



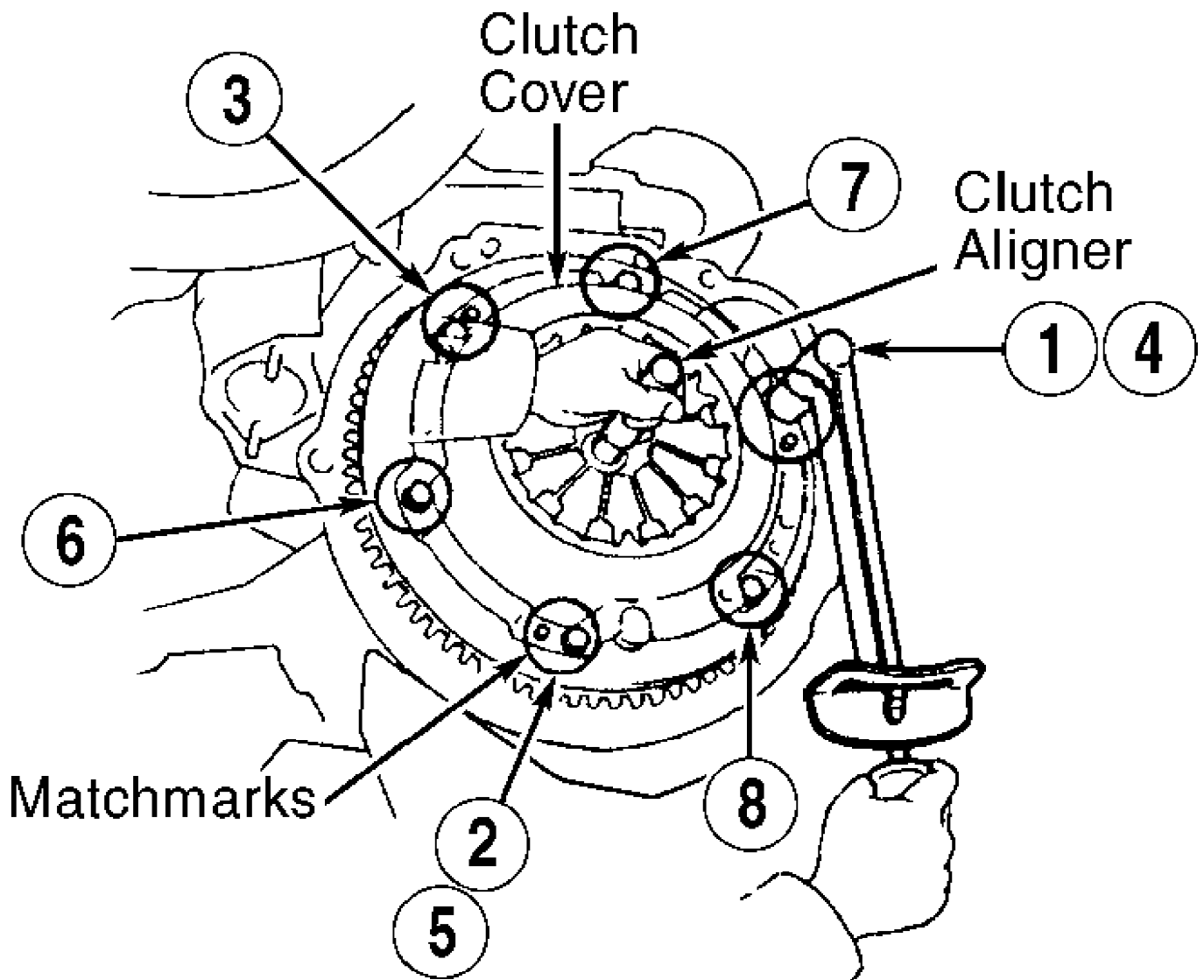
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SUPRA TURBO

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Fig. 6: Checking Diaphragm Spring Depth & Width (Typical)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.



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Fig. 7: Identifying Clutch Cover Tightening Sequence (Typical)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

Removal

1) Disconnect negative battery cable. Remove shift knob from shift lever. Using a screwdriver, pry upper console panel (near shift lever) upward for access to shift lever bolts.

2) Remove bolts and shift lever boots. Remove shift lever bolts. On non-turbo models, remove upper shroud bolts from radiator. On all models, raise and support vehicle. Drain transmission fluid. Remove front exhaust pipe and support bracket.

3) Remove center exhaust pipe that fits between front exhaust pipe and tailpipe with muffler assembly. Remove heat insulator from body for access to drive shaft.

4) Remove crossmember brace bolted to body, below drive shaft. Place reference mark on drive shaft flanges for reassembly reference.

5) Remove drive shaft flange-to-differential flange bolts. DO NOT remove drive shaft-to-drive shaft flange bolts. Support drive shaft and remove drive shaft center bearing bolts. Remove adjusting

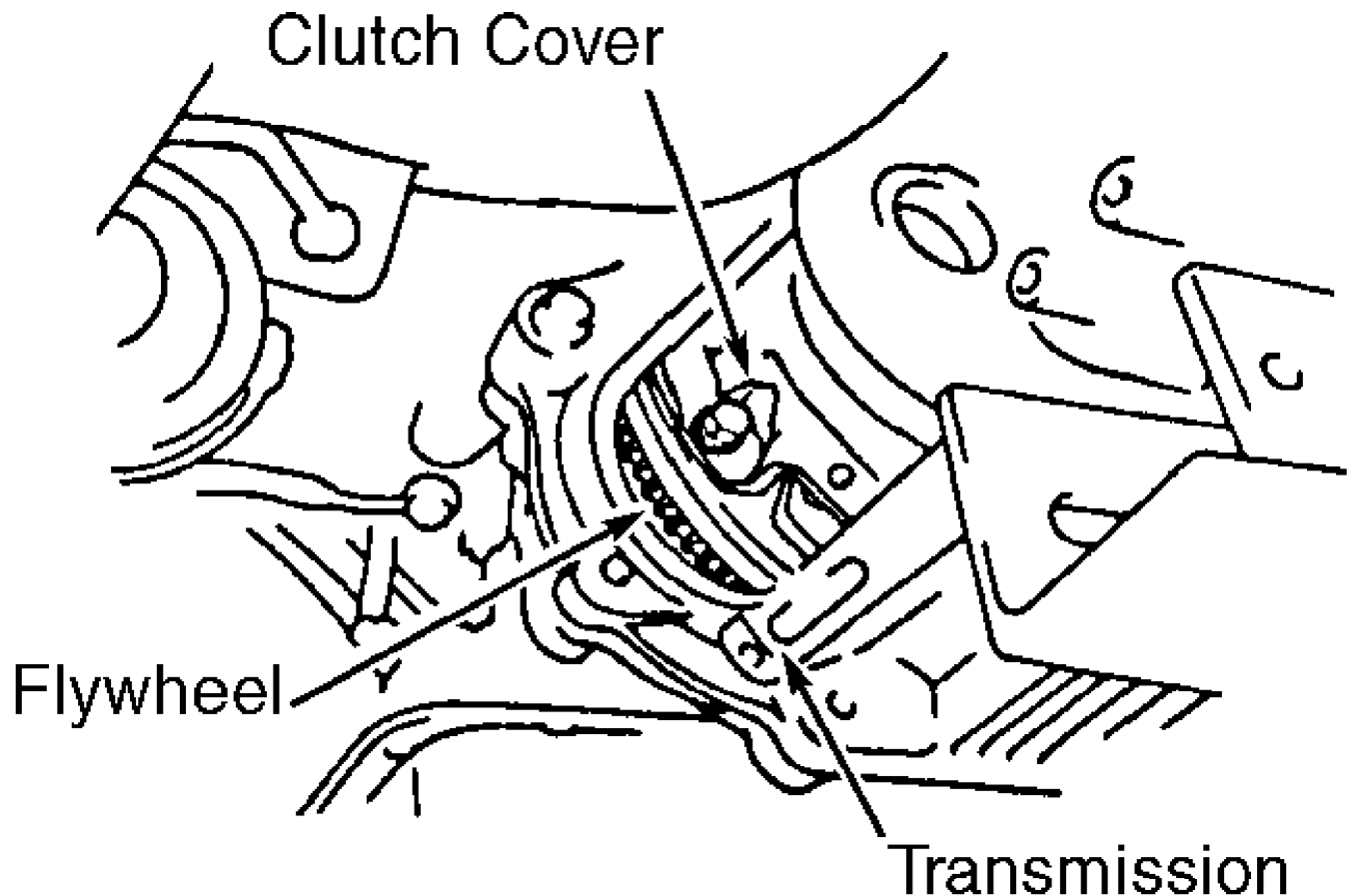
washers that fit between drive shaft center bearing and body (if equipped).

6) On turbo models, remove drive shaft flange-to-transmission flange nuts. On all models, slide drive shaft assembly forward to disengage drive shaft from centering pin on differential flange. Remove drive shaft.

7) Remove shift lever-to-shift linkage bolt at rear of transmission. Remove shift lever. Remove clutch release cylinder with hose attached and secure aside. Disconnect necessary electrical connectors at transmission. Remove starter.

NOTE: On turbo models, clutch cover bolts must be removed before transmission can be removed.

8) On turbo models, remove cover on driver's side of transmission for access to clutch cover bolts. Place reference mark on clutch cover and flywheel for reassembly reference. Remove 6 clutch cover bolts from flywheel. See Fig. 8.



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Fig. 8: Removing & Installing Clutch Cover Bolts (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

9) On all models, support engine with hoist. Using a transmission jack, slightly raise transmission to remove weight from mount.

10) Remove bolts/nuts and crossmember located at rear of transmission. Slightly lower engine. Remove transmission mounting bolts and transmission.

NOTE: On turbo models, clutch cover and disc will be removed with transmission.

11) On non-turbo models, place reference mark on clutch cover and flywheel for reassembly reference. Alternately loosen clutch cover bolts until spring tension is released. Remove clutch cover and clutch disc.

12) Remove clutch release fork, clutch release bearing and pivot stud from transmission (if necessary). See Fig. 5.

13) On turbo models, remove clutch release fork assembly from transmission. See Fig. 5. Remove clutch disc and clutch cover from transmission.

14) Remove snap ring from end of hub at clutch disc side of clutch cover. Remove hub, cone spring and plate washer from clutch cover.

15) Remove snap ring from clutch release bearing at diaphragm spring side of clutch cover. Remove clutch release bearing, plate washer and wave washer from clutch cover.

Inspection

1) Check wear on facings of clutch disc by measuring depth of each rivet head. Minimum depth at any rivet is .012" (.30 mm). Check clutch disc runout. Maximum runout at facing on clutch disc is .031" (.80 mm). Replace clutch disc if not within specification.

2) Using a dial indicator, check flywheel runout. Replace flywheel if flywheel runout is greater than .004" (.10 mm).

3) Using a caliper, measure depth and wear on diaphragm spring on clutch cover. See Fig. 6. Maximum depth is .024" (.60 mm) and maximum width is .197" (5.00 mm). Replace clutch cover if necessary.

4) Ensure clutch release bearing rotates smoothly. Ensure pilot bearing at end of crankshaft rotates smoothly. Replace clutch release bearing or pilot bearing if necessary.

5) Using a dial indicator, check diaphragm spring tip runout. If diaphragm spring tip runout is greater than .02" (.5 mm), adjust or replace clutch cover.

NOTE: On turbo models, flywheel consists of a secondary and primary flywheel. Special inspection procedure of flywheel must be performed. See steps 6) through 9).

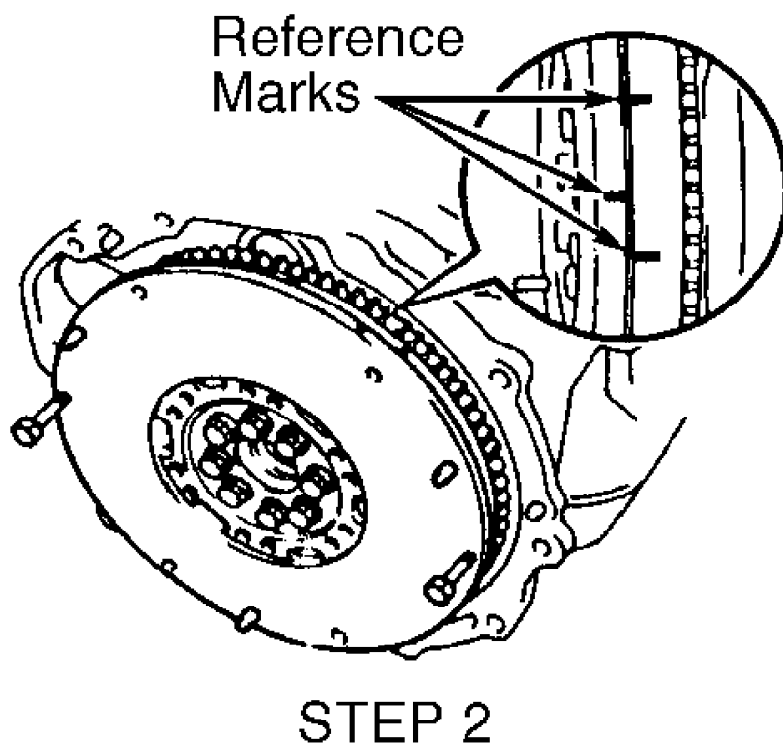
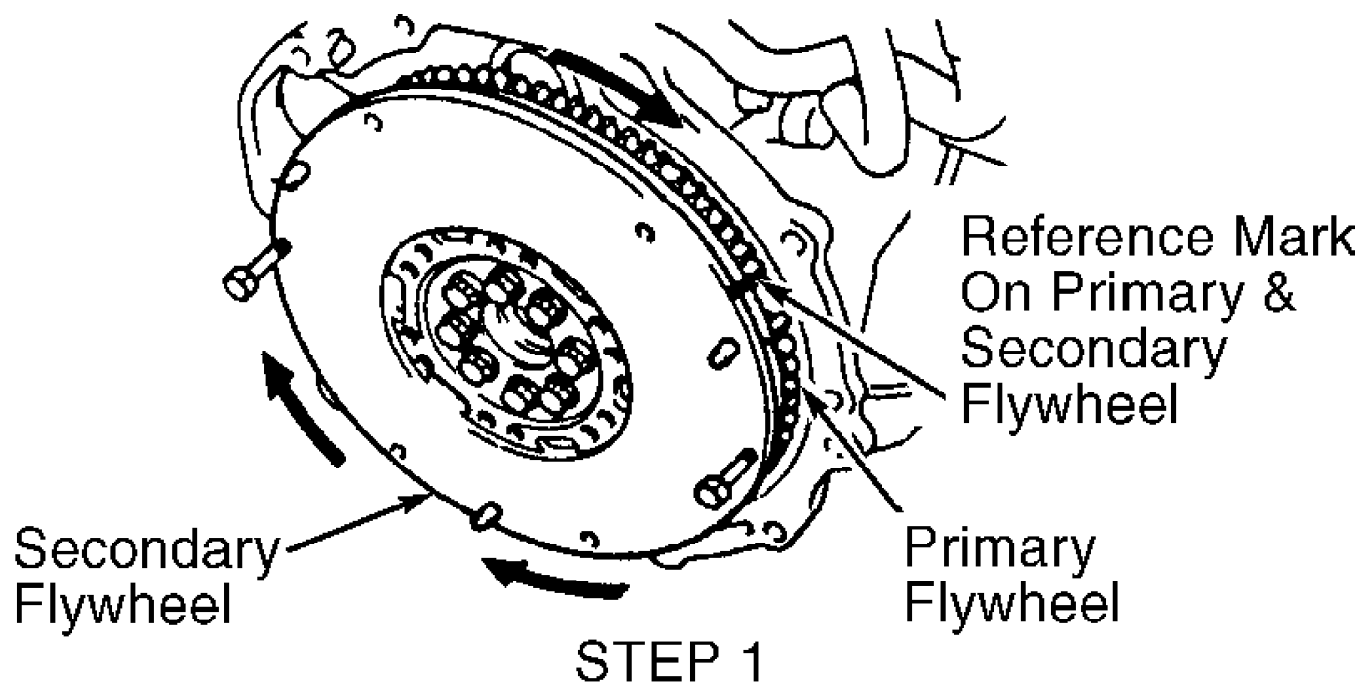
6) On turbo models, note if any oil leakage exists in clutch housing. Replace flywheel assembly if any oil leakage exists.

7) Flywheel damper rotational free play must be checked. Install 2 bolts in secondary flywheel opposite each other. See Fig. 9.

8) While holding bolts, rotate secondary flywheel clockwise until flywheel stops. Perform STEP 1. See Fig. 9. Place reference marks on primary flywheel and secondary flywheel at this position.

9) Rotate primary flywheel counterclockwise until flywheel stops. Place reference mark on primary flywheel at this position. Perform STEP 2. See Fig. 9. Measure circumferential length between both reference marks on primary flywheel.

10) Repeat step 9) 4 times to obtain greatest length. Replace flywheel assembly if circumferential length is greater than 4.134" (105.00 mm).



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Fig. 9: Checking Flywheel Damper Rotational Free Play (Turbo)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

Installation

1) If installing flywheel, install and alternately tighten flywheel bolts in sequence to specification. See TORQUE SPECIFICATIONS . See Fig. 7.

2) On non-turbo models, install clutch disc in clutch cover. Align reference marks on clutch cover and flywheel. Install clutch disc and clutch cover on flywheel.

3) Using a clutch aligner, center clutch disc on flywheel. Install and alternately tighten clutch cover bolts in a crisscross pattern to specification. See TORQUE SPECIFICATIONS.

4) Apply molybdenum disulfide grease to clutch release fork-to-pivot stud contact surfaces, hub on clutch release bearing and clutch disc splines. Install clutch release fork and clutch release bearing on transmission (if removed).

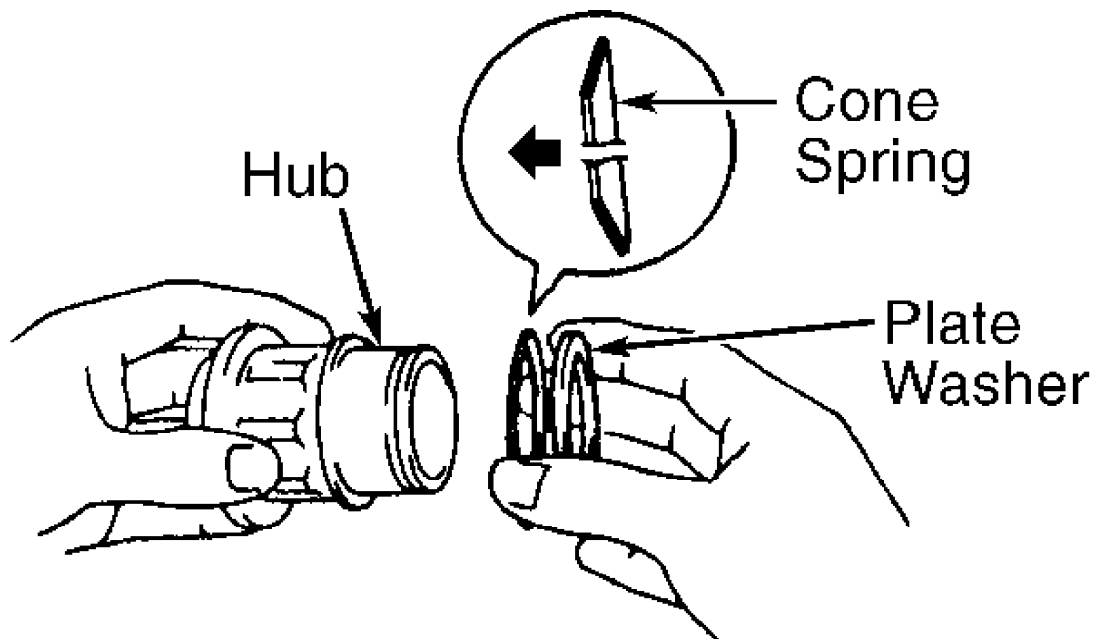
5) On turbo models, use NEW clip ring when installing pin in clutch release fork (if removed). Apply molybdenum disulfide grease to clutch release fork-to-hub and pin contact surfaces, hub and splines on clutch release bearing and clutch disc splines.

6) Using NEW snap rings, install clutch release bearing and components on clutch cover. Ensure cone spring is installed in correct direction on hub. See Fig. 10. Install clutch disc, clutch cover and clutch release fork on transmission.

7) On all models, to install remaining components, reverse removal procedure. Tighten bolt/nuts to specification. See TORQUE SPECIFICATIONS.

CAUTION: On turbo models, ensure reference marks on clutch cover and flywheel are aligned before installing and tightening clutch cover bolts to specification once transmission is installed on cylinder block.

8) Before installing drive shaft, apply grease on bushing on inside of drive shaft at differential end of drive shaft. Ensure reference marks on drive shaft flanges are aligned. On non-turbo models, fill transmission with 75W-90 gear oil with API GL-4 or GL-5 rating. On turbo models, fill transmission with Toyota Gear Oil V160.



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Fig. 10: Installing Cone Spring On Hub (Turbo)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

Removal & Installation

1) Remove brake fluid from clutch master cylinder.

2) Remove clip and clevis pin from push rod assembly at clutch pedal. Disconnect hydraulic line at clutch master cylinder. Remove nuts and clutch master cylinder.

3) To install, reverse removal procedure. Bleed hydraulic system. Adjust clutch pedal height, clutch free play and push rod play. See CLUTCH PEDAL HEIGHT and CLUTCH PEDAL FREE PLAY & PUSH ROD PLAY under ADJUSTMENTS.

CLUTCH RELEASE CYLINDER

Disconnect hydraulic line at clutch release cylinder. Remove bolts and clutch release cylinder. To install, reverse removal procedure. Bleed hydraulic system.

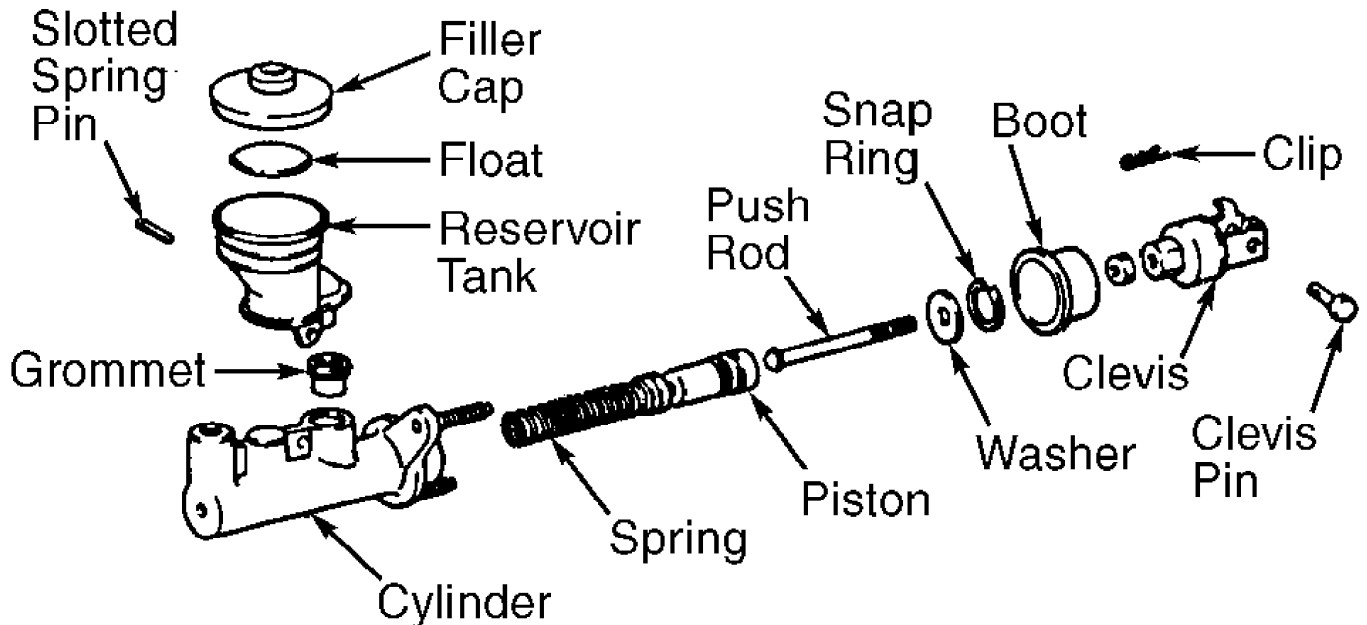
PILOT BEARING

Removal & Installation

Remove pilot bearing from crankshaft with Bearing Puller (SST 09303-35011). Coat NEW pilot bearing with multipurpose grease and drive into crankshaft with Bearing Driver (SST 09304-30012).

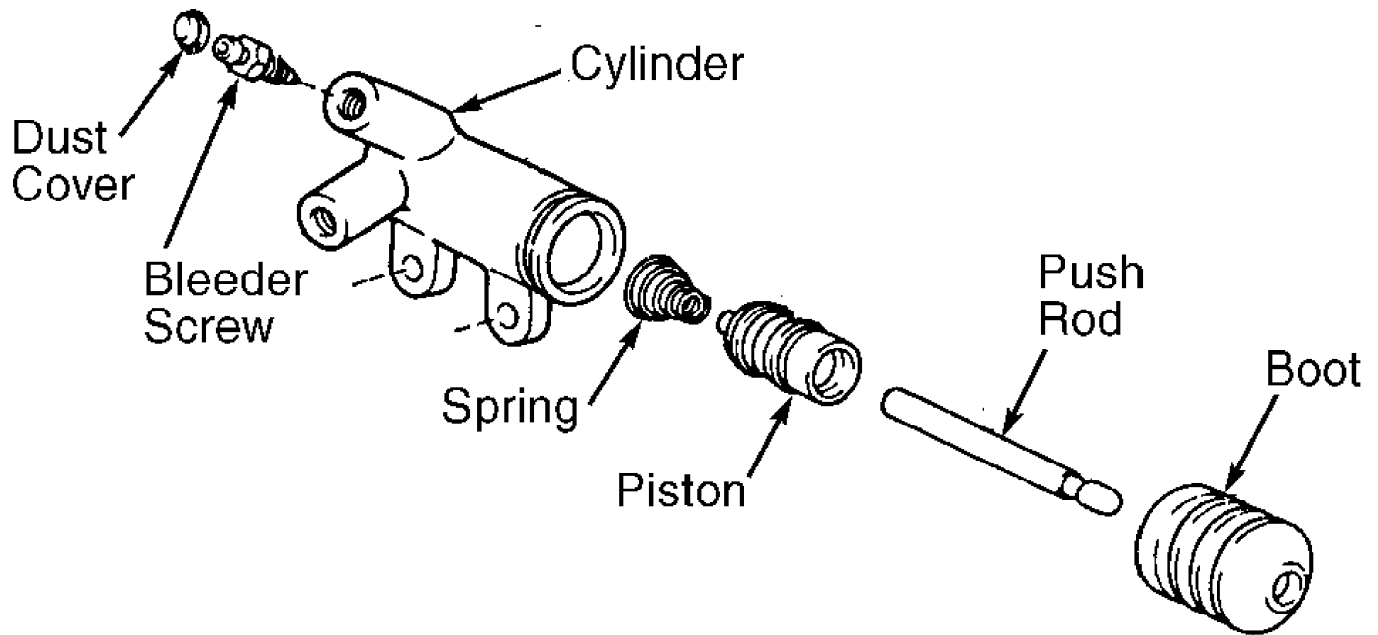
OVERHAUL

NOTE: Overhaul procedure information is not available at time of publication. Manufacturer provides exploded views only. See Fig. 11.



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Fig. 11: Exploded View Of Clutch Master Cylinder (Typical)
Courtesy of Toyota Motor Sales, U.S.A., Inc.



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Fig. 12: Exploded View Of Clutch Release Cylinder (Typical)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Clutch Cover Bolt	14 (19)
Clutch Release Fork Support Bolt (Turbo Models)	18 (24)
Crossmember Bolt/Nut	
Bolt	19 (26)
Nut	(1)
Crossmember Brace Bolt	(1)
Drive Shaft Center Bearing Bolt	36 (49)
Drive Shaft Flange-To-Differential Flange Bolt	58 (79)
Drive Shaft Flange-To-Transmission Flange Nut	41 (56)
Exhaust Pipe Bracket Bolt (Front)	27 (37)
Exhaust Pipe Flange Nut (Front)	43 (58)
Flywheel Bolt	
Step 1	36 (49)
Step 2	Additional 90 Degrees
Oxygen Sensor Nut	14 (19)
Pivot Stud-To-Transmission	
Turbo	18 (24)
Non Turbo	29 (39)
Shift Lever-To-Shift Linkage Bolt	14 (19)
Starter Bolt	29 (39)
Transmission-To-Engine Bolt	
10-mm Bolt	27 (37)
12-mm Bolt	53 (72)

(1) - Tighten to 115 INCH lbs. (13.0 N.m).

