

BRAKE SYSTEM

1996 Toyota Supra

1995-96 BRAKES
Toyota Disc & Drum - RWD Cars

Supra

* PLEASE READ THIS FIRST *

WARNING: For warnings and procedures regarding vehicles equipped with Anti-Lock Brake System (ABS), see ANTI-LOCK BRAKE SYSTEM article.

DESCRIPTION & OPERATION

The hydraulic brake system uses a tandem master cylinder with a vacuum power assist servo. All models are equipped with 4-wheel disc brakes. A proportioning valve is used to regulate brake pressure between front and rear brakes.

Parking brake lever mechanically activates rear brakes. Parking brake is a duo servo mechanical drum brake design built into bell of rear rotor assemblies.

BLEEDING BRAKE SYSTEM

BRAKE BLEEDING PROCEDURES

CAUTION: DO NOT allow reservoir to run dry during brake bleeding procedure. Use only clean brake fluid. Ensure no dirt or other foreign matter contaminates brake fluid. DO NOT mix different brands of brake fluid, as they may not be compatible. DO NOT spill brake fluid on vehicle, as it may damage paint. If brake fluid contacts paint, immediately wash with water.

1) If master cylinder is rebuilt or reservoir is empty, bleed master cylinder first. Bleed remaining wheels starting on wheel with longest hydraulic line and work toward wheel with shortest hydraulic line.

2) Raise and support vehicle. Ensure brake fluid reservoir remains at least half full of brake fluid during bleeding procedure. Connect one end of transparent vinyl tube to bleeder plug. Submerge other end of tube in a container half filled with clean brake fluid.

3) Have an assistant depress brake pedal several times and hold in depressed position. Loosen bleeder plug and drain fluid into container. Tighten bleeder plug.

NOTE: Ensure brake pedal remains depressed until bleeder plug is tightened.

4) Refill brake fluid reservoir as necessary. Repeat step 3) until air is no longer discharged. Tighten bleeder plug to 97 INCH lbs. (11 N.m). Ensure fluid leakage is not present. Add fluid to reservoir. Repeat procedure for remaining wheels.

TRACTION CONTROL BLEEDING

NOTE: On models with traction control, whenever the master cylinder and/or power booster is removed, the traction control system must be bled.

1) Ensure battery voltage is 10-14 volts. Disconnect electrical connector from traction control pump. Connect one end of Actuator Bleed Wire (09990-00330) to pump. Connect one end of a clear vinyl tube to bleed port on traction control actuator. Submerge other end of tube in a container half filled with clean brake fluid.

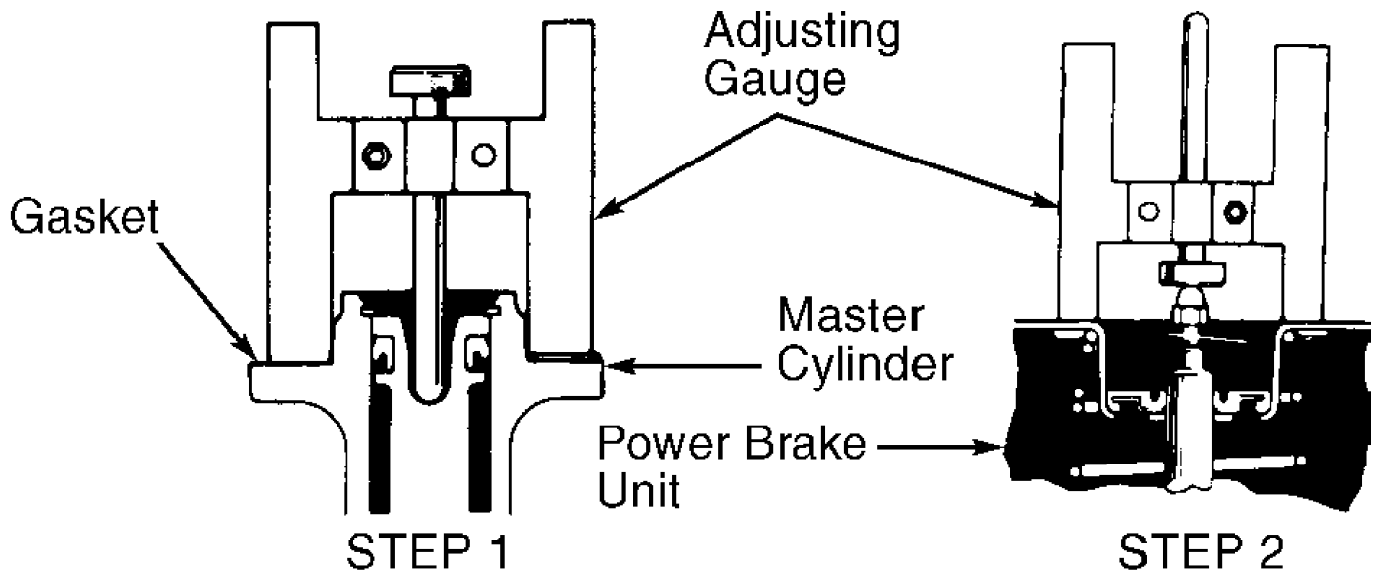
2) Loosen bleeder plug and start engine. Connect actuator bleed wire leads to battery and allow actuator pump to run for at least 60 seconds. Tighten bleeder plug. Allow traction pump to run for about 30 seconds. Check master cylinder fluid level. Reconnect traction pump electrical connector. Check for any ABS DTCs. Refer to ANTI-LOCK BRAKE SYSTEM article.

ADJUSTMENTS

BRAKE BOOSTER PUSH ROD

1) Install Adjusting Gauge (09737-00010) onto master cylinder, with master cylinder gasket in place. Lower gauge pin until pin just touches master cylinder piston. Perform STEP 1. See Fig. 1. Invert and install gauge onto power brake booster. Perform STEP 2. See Fig. 1.

2) Measure clearance between power brake booster push rod and adjusting gauge pin head. Clearance should be zero. If clearance is not zero, adjust power brake booster push rod length until push rod just touches adjusting gauge pin.



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Fig. 1: Adjusting Master Cylinder Push Rod
Courtesy of Toyota Motor Sales, U.S.A., Inc.

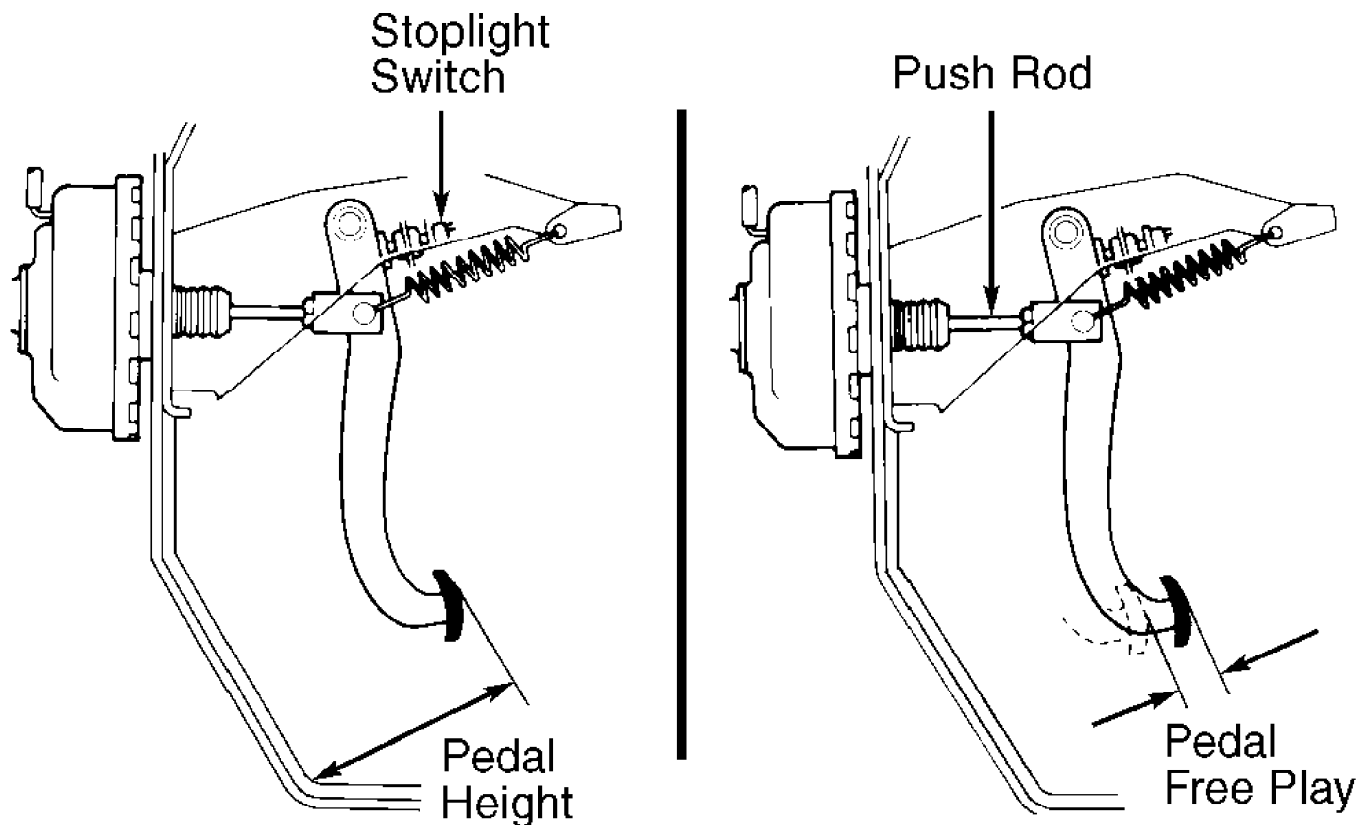
BRAKE PEDAL HEIGHT

1) Measure brake pedal height from face of brake pedal pad to asphalt sheet under carpet. See Fig. 2. Brake pedal height should be 6.1-6.5" (154-164 mm).

2) To adjust brake pedal height, remove instrument lower finish panel. Unplug stoplight switch connector. Loosen stoplight switch lock nut. Remove stoplight switch.

3) Adjust pedal height by rotating brake pedal push rod.

After adjusting brake pedal height, tighten push rod lock nut. Install and adjust stoplight switch. See STOPLIGHT SWITCH. Check and adjust brake pedal free play. See BRAKE PEDAL FREE PLAY.



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Fig. 2: Measuring Pedal Height & Free Play
Courtesy of Toyota Motor Sales, U.S.A., Inc.

BRAKE PEDAL FREE PLAY

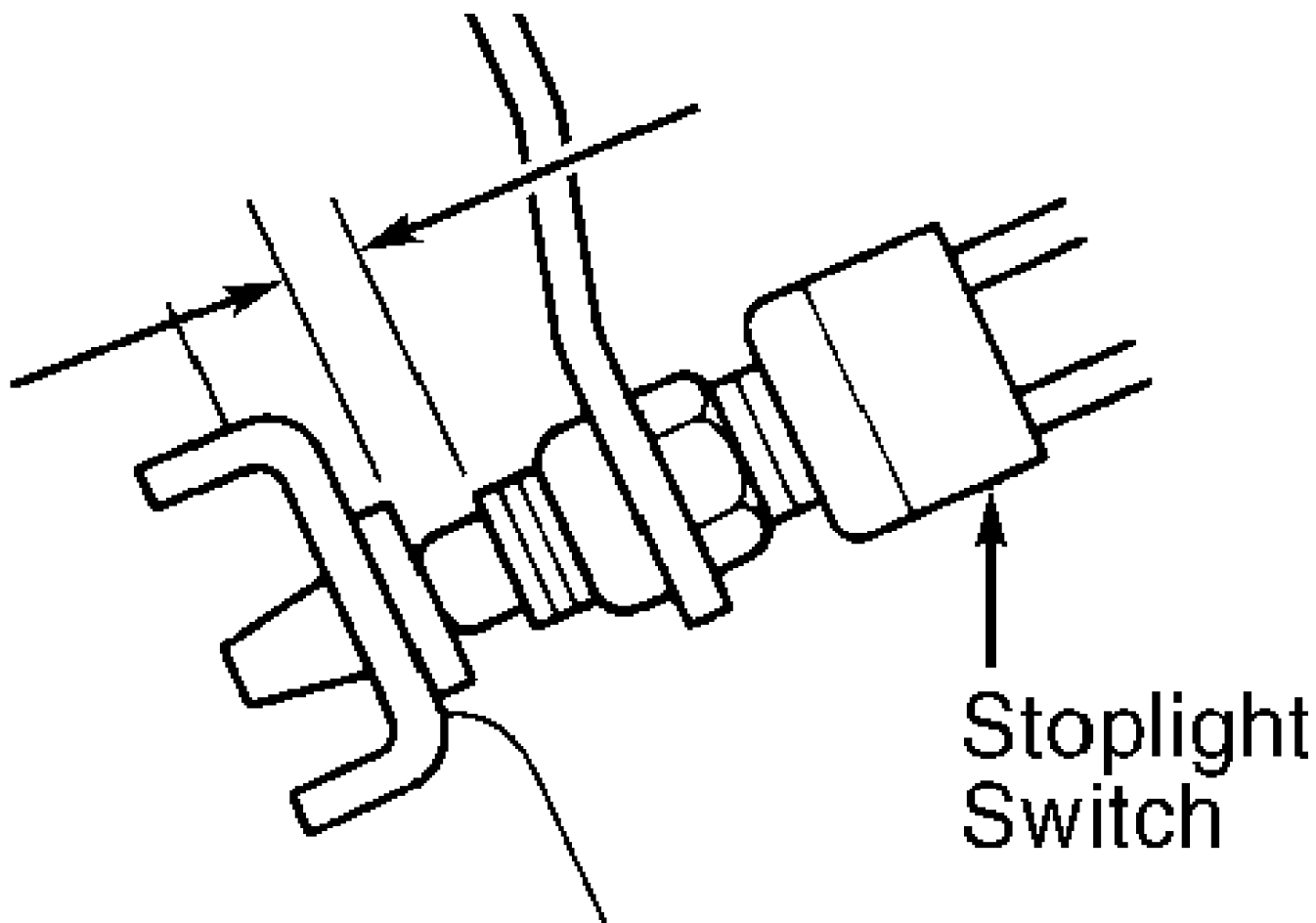
NOTE: Stoplight switch adjustment should be performed before brake pedal free play adjustment is made. See STOPLIGHT SWITCH.

1) Brake pedal free play is distance brake pedal travels, with engine off, before feeling resistance. To check brake pedal free play, press brake pedal several times to exhaust vacuum from power brake unit. Depress brake pedal until initial resistance is felt, and measure distance traveled.

2) Brake pedal free play should be .04-.24" (1.0-6.0 mm). If free play is not within specification, adjust by rotating brake booster push rod. See Fig. 2. After adjusting brake pedal free play, check brake pedal height. See BRAKE PEDAL HEIGHT.

STOPLIGHT SWITCH

Stoplight switch is located above brake pedal. See Fig. 3. To adjust stoplight switch, loosen stoplight switch lock nut, and turn stoplight switch until clearance between switch and brake pedal stop is .02-.09" (.5-2.4 mm). Tighten lock nut. Check stoplight operation. Check brake pedal free play. See BRAKE PEDAL FREE PLAY.



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Fig. 3: Adjusting Stoplight Switch Clearance
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

BRAKE PEDAL RESERVE DISTANCE

Measure brake pedal reserve distance from face of pedal pad to asphalt sheet under carpet with engine running and force of 110 lbs. (50 kg) applied to brake pedal. Minimum brake pedal reserve distance should be 2.83" (72.0 mm) for models without TRAC and 2.76" (70.0 mm) for models with TRAC. If distance is less than specified, inspect brake system.

PARKING BRAKE

Parking Brake Shoes

Raise and support vehicle. Remove rear wheels. Temporarily install hub nuts to hold disc brake rotor in place. Remove hole plug to access parking brake shoe adjuster. Rotate adjuster to expand shoes until disc brake rotor locks. Back off adjuster 8 notches. Install hole plug. Settle brake shoes in disc.

Settling Parking Brake Shoes & Disc

Drive vehicle at 31 MPH. Hold parking brake release button and pull parking brake lever with a force of 20 lbs. (9 kg) for .25 miles (400 meters), then release. Perform this procedure 2 or 3 times,

then adjust parking brake cable. See PARKING BRAKE CABLE.

PARKING BRAKE CABLE

NOTE: Parking brake shoe clearance on rear disc brakes must be adjusted before adjusting parking brake cable. See PARKING BRAKE.

Parking brake lever stroke should be 5-8 notches (clicks) with a pull force of 44 lbs. (20 kg). To adjust stroke, remove console box. Loosen parking brake cable lock nut. Rotate adjuster nut until parking brake lever travel is as specified. Tighten lock nut. Install console box.

TESTING

BRAKE BOOSTER

Functional Test

1) Start engine. Turn ignition off. Depress brake pedal several times. Depress pedal firmly and hold pressure for 15 seconds. If pedal sinks, master cylinder, brakeline or caliper piston is faulty.

2) Start engine with pedal depressed. If pedal sinks slightly, vacuum unit is working properly. If pedal height does not vary, power brake unit or check valve is faulty. Replace as necessary.

Leak Test

1) Depress brake pedal with engine running. Turn ignition off. If pedal height does not vary while depressed for 30 seconds, vacuum booster is okay. If pedal height changes, check for air leaks.

2) With engine stopped, depress brake pedal several times using normal pressure. Pedal should be low when first depressed. On consecutive applications, pedal height should gradually increase. If pedal height does not increase, check for air leaks.

PROPORTIONING & BY-PASS VALVE

1) Install SST (09709-29017) gauge set on front and rear calipers. Bleed air from system. See BLEEDING BRAKE SYSTEM. Raise master cylinder (front) pressure and read gauge at rear wheel. See PROPORTIONING & BY-PASS VALVE PRESSURE SPECIFICATIONS TABLE.

2) Check system at specified pressures. Rear pressure increase should be less than front pressure increase. If rear caliper pressure is not within specification, replace valve assembly.

PROPORTIONING & BY-PASS VALVE PRESSURE SPECIFICATIONS TABLE

Application	Front Pressure psi (kg/cm ²)	Rear Pressure psi (kg/cm ²)
Non-Turbo	427 (30) 1138 (80)	427 (30) 690 (48.5)
Turbo	356 (25) 1138 (80)	356 (25) 646 (45.4)

REMOVAL & INSTALLATION

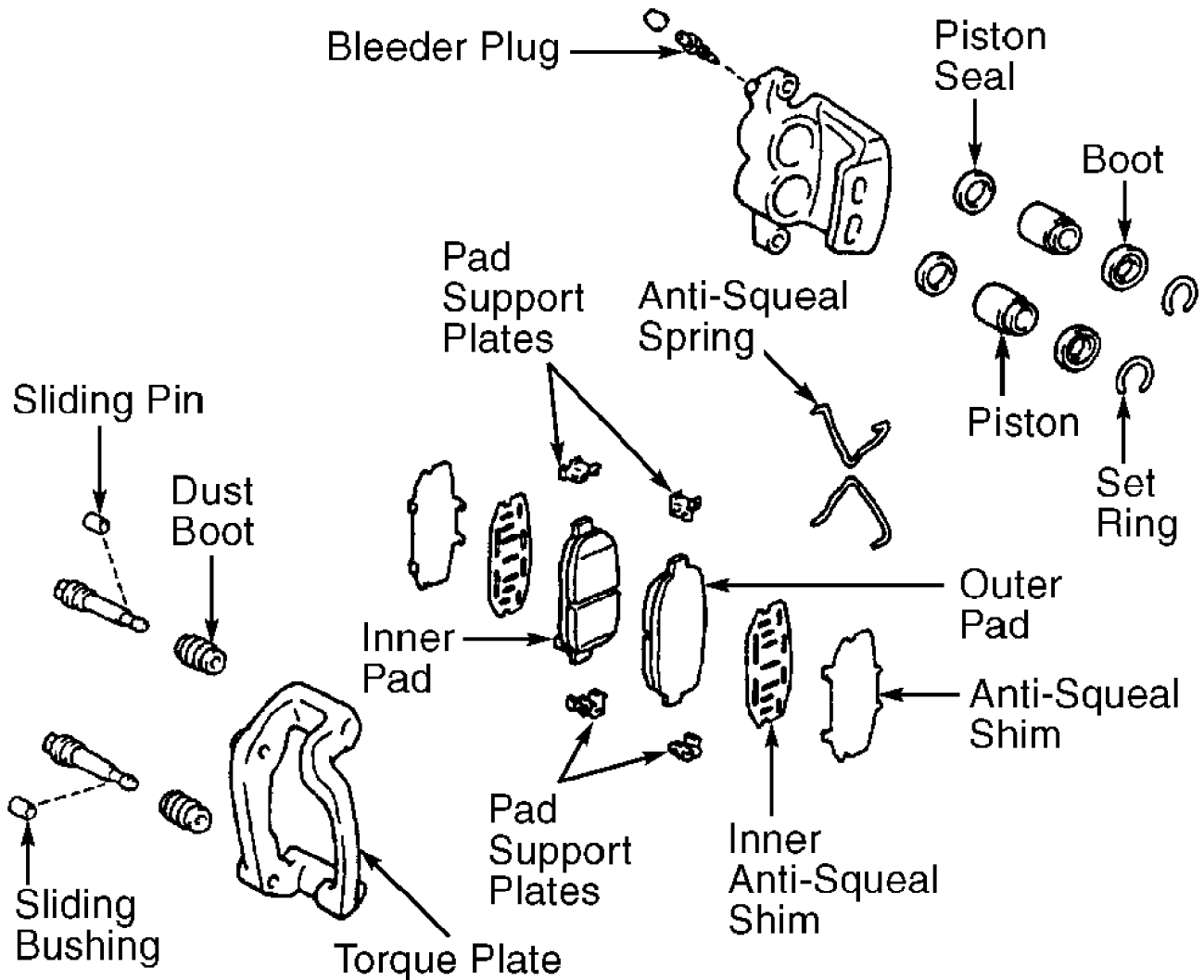
FRONT DISC BRAKE PADS

NOTE: Location and number of anti-rattle springs, anti-squeal shims and pad support plates vary with models. Note component locations during removal for installation reference.

Removal

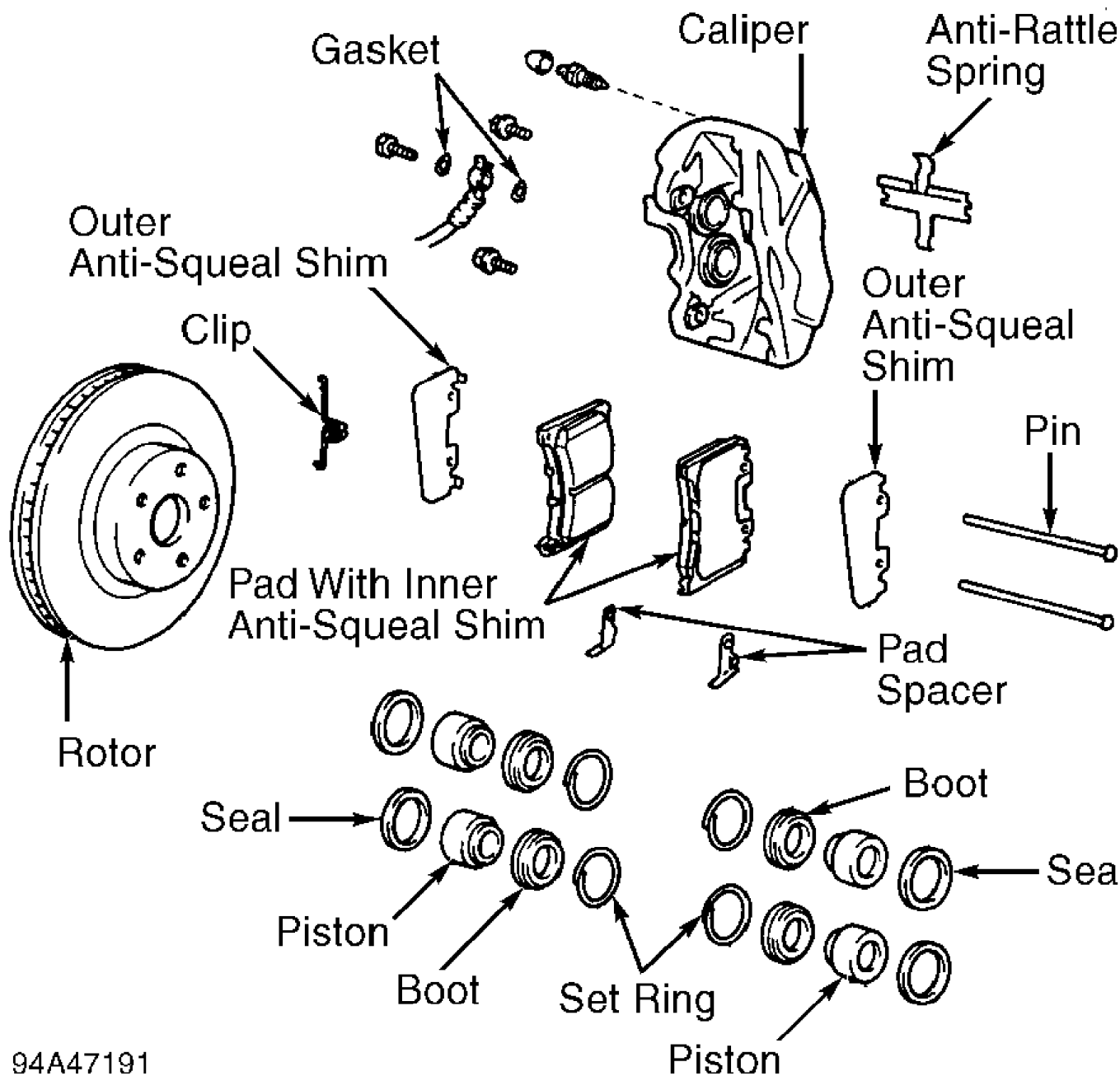
1) Raise and support vehicle. Remove wheel assembly. Temporarily install wheel lug nuts to retain rotor position. On non-turbo models, remove brake caliper from torque plate, and wire aside, leaving brake hose connected. Remove anti-rattle springs, anti-squeal shims and pads. Remove pad support plates and pad wear indicators. See Fig. 4.

2) On turbo models, remove clip, 2 pins, anti-rattle spring, spacers and anti-squeal shims. Remove pads. See Fig. 5. On all models, check rotor thickness and runout. Measure brake pads, and replace as necessary. See DISC & DRUM BRAKE SPECIFICATIONS.



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Fig. 4: Exploded View Of Front Brake Caliper Assembly (Non-Turbo)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.



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Fig. 5: Exploded View Of Front Brake Caliper Assembly (Turbo)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

NOTE: Some models have one or more sets of anti-squeal shims. If one set of shims is vented, place it between pad and outer anti-squeal shim.

Installation

1) On turbo models, install anti-squeal shim and pad spacer on NEW pads. On non-turbo models, install pad support plates and NEW pads. Install pad wear indicators, anti-squeal shims and anti-rattle springs. On all models, apply disc brake grease to inner anti-squeal shims. DO NOT allow grease to contact rubbing face of pads. Wear indicator must be on bottom side of pad.

NOTE: Pushing piston into caliper bore will force fluid back into master cylinder reservoir. Remove reservoir cap when compressing piston.

2) Push piston into caliper bore. DO NOT let piston dust boot wedge against edge of pads. To complete installation, reverse removal procedure. Tighten bolts to specification. See TORQUE SPECIFICATIONS. Check reservoir fluid level.

FRONT BRAKE CALIPER

Removal

Raise and support vehicle. Remove wheel assembly. Disconnect brake hose from caliper. Plug hose to prevent fluid leak. Remove caliper slide pins as necessary. Remove caliper from torque plate.

NOTE: Pushing piston into caliper bore will force fluid back into master cylinder reservoir. Remove reservoir cap when compressing piston.

Installation

Push piston into caliper bore, as necessary. DO NOT let piston dust boot wedge against edge of pads. To install, reverse removal procedure. Tighten bolts to specification. See TORQUE SPECIFICATIONS. Check reservoir fluid level.

FRONT BRAKE ROTOR

Removal & Installation

1) Remove caliper assembly with brake hose connected, and wire aside. See FRONT DISC BRAKE PADS. Remove torque plate from knuckle.

2) Mark rotor and hub for installation reference. Slide rotor off hub assembly. To install, reverse removal procedure. Tighten bolts to specification. See TORQUE SPECIFICATIONS.

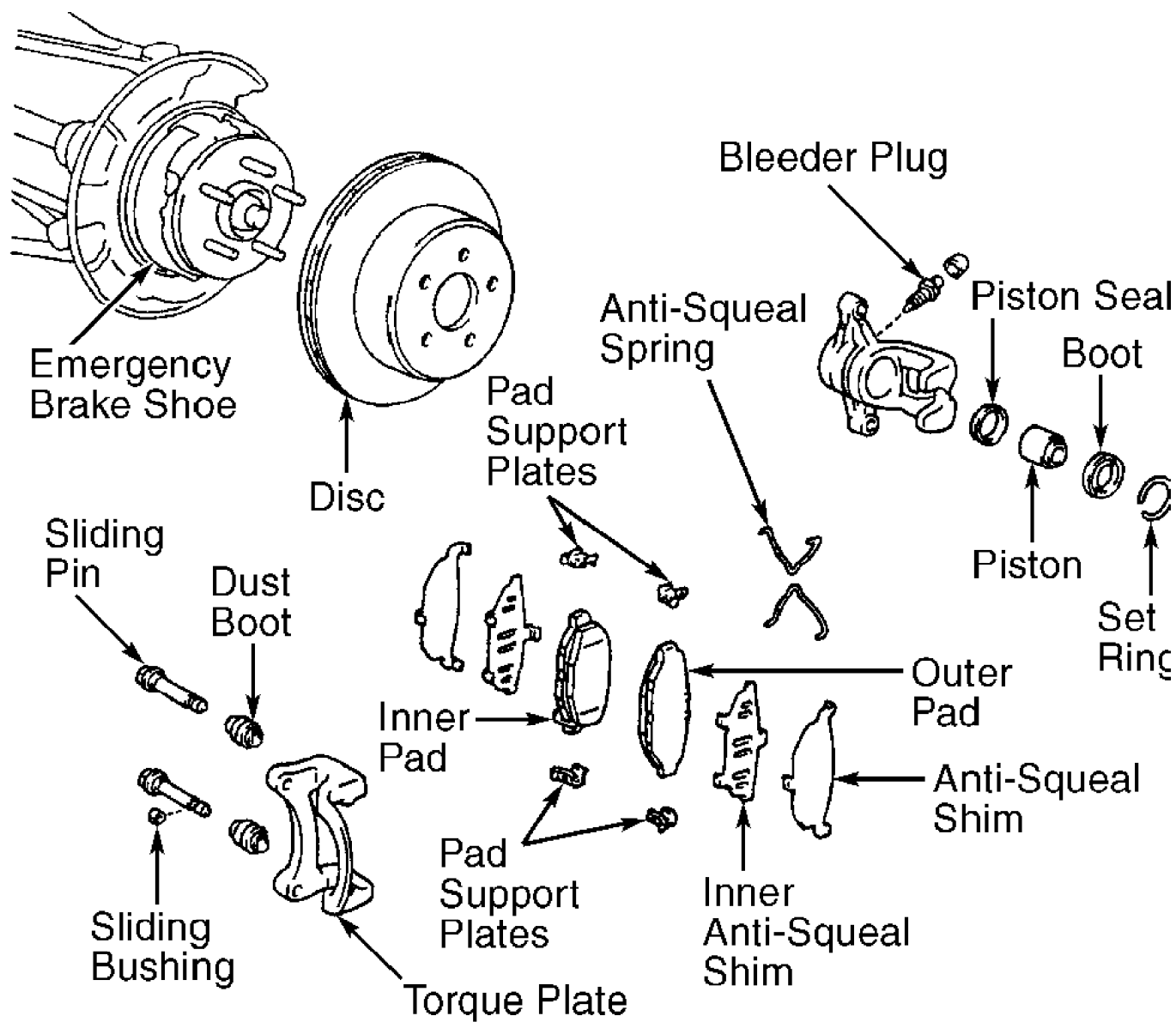
REAR DISC BRAKE PADS

NOTE: Location and number of anti-rattle springs, anti-squeal shims and pad support plates vary with models. Note component locations during removal for installation reference.

Removal

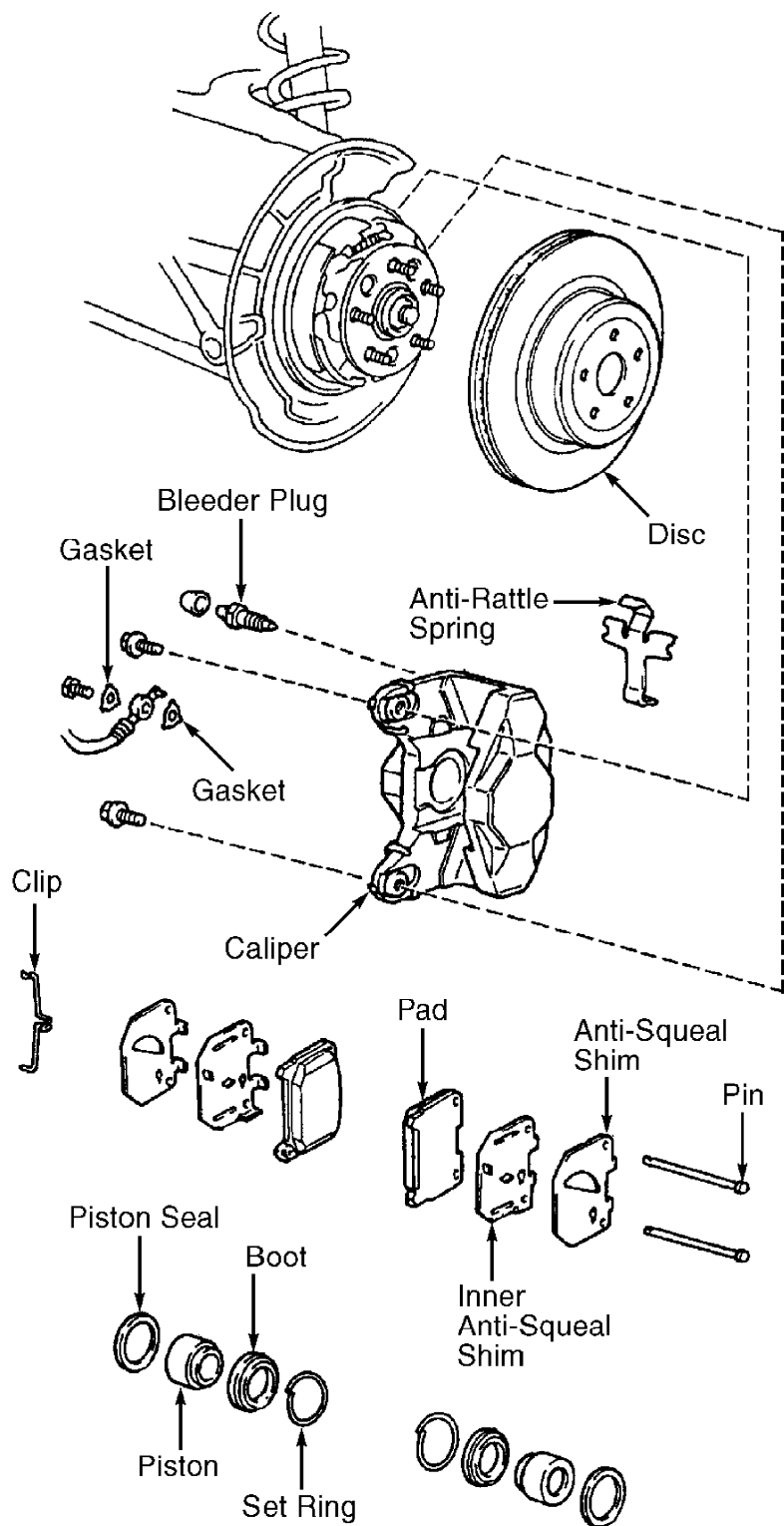
1) Raise and support vehicle. Remove wheel assembly. Temporarily install wheel lug nuts to retain rotor position. On non-turbo models, remove brake caliper from torque plate, and wire aside, leaving brake hose connected. Remove anti-rattle springs, anti-squeal shims and pads. See Fig. 6. Remove pad support plates and pad wear indicators.

2) On turbo models, remove clip, 2 pins, anti-rattle spring, spacers and anti-squeal shims. Remove pads. See Fig. 7. On all models, check rotor thickness and runout. Measure brake pads, and replace as necessary. See DISC & DRUM BRAKE SPECIFICATIONS.



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Fig. 6: Exploded View Of Rear Brake Caliper Assembly (Non-Turbo)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.



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Fig. 7: Exploded View Of Rear Brake Caliper Assembly (Turbo)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

NOTE: Some models have one or more sets of anti-squeal shims. If one set of shims is vented, place it between pad and outer

anti-squeal shim.

Installation

1) On turbo models, install anti-squeal shim and pad spacer on NEW pads. On non-turbo models, install pad support plates and NEW pads. Install pad wear indicators, anti-squeal shims and anti-rattle springs. On all models, apply disc brake grease to inner anti-squeal shims. DO NOT allow grease to contact rubbing face of pads. Ensure wear indicator is on bottom side of pad.

NOTE: Pushing piston into caliper bore will force fluid back into master cylinder reservoir. Remove reservoir cap when compressing piston.

2) Push piston into caliper bore. DO NOT let piston dust boot wedge against edge of pads. To complete installation, reverse removal procedure. Tighten bolts to specification. See TORQUE SPECIFICATIONS. Check reservoir fluid level.

REAR BRAKE CALIPER

Removal

Raise and support vehicle. Remove wheel assembly. Disconnect brake hose from caliper. Plug hose to prevent fluid leak. Remove caliper mounting bolts or slide pins as necessary. Remove caliper from torque plate.

NOTE: Pushing piston into caliper bore will force fluid back into master cylinder reservoir. Remove reservoir cap when compressing piston.

Installation

Push piston into caliper bore, as necessary. DO NOT let piston dust boot wedge against edge of pads. To install, reverse removal procedure. Tighten bolts to specification. See TORQUE SPECIFICATIONS. Check reservoir fluid level.

REAR BRAKE ROTOR

Removal & Installation

1) Remove caliper assembly with brakeline connected, and wire aside. See REAR BRAKE CALIPER. Remove torque plate from backing plate.

2) Mark rotor and hub for installation reference. Slide rotor off hub assembly. Turn parking brake shoe adjuster to release shoes from rotor (as necessary) to remove rotor. To install, reverse removal procedure. Tighten bolts to specification. See TORQUE SPECIFICATIONS.

MASTER CYLINDER

Removal

Disconnect level warning switch connector. Drain brake fluid from reservoir. Disconnect and plug brakelines. Remove master cylinder-to-power brake unit nuts. Remove master cylinder.

Installation

To install, reverse removal procedure. Tighten nuts to specification. See TORQUE SPECIFICATIONS. Check and adjust power brake unit push rod. See BRAKE BOOSTER PUSH ROD under ADJUSTMENTS. Bleed brake system. On models with traction control system, TRAC system must also be bled. See BLEEDING BRAKE SYSTEM.

BRAKE BOOSTER

Removal & Installation

- 1) Remove master cylinder. See MASTER CYLINDER. Disconnect vacuum hose from power brake unit. Disconnect push rod at brake pedal.
- 2) On models with traction control system, TRAC actuator and TRAC pump assembly must be removed. On all models, remove power brake unit. To install, reverse removal procedure. Tighten nuts to specification. See TORQUE SPECIFICATIONS. Check and adjust push rod. See BRAKE BOOSTER PUSH ROD under ADJUSTMENTS. Bleed brake and TRAC system. See BLEEDING BRAKE SYSTEM.

REAR PARKING BRAKE (INTERNAL SHOE)

Removal

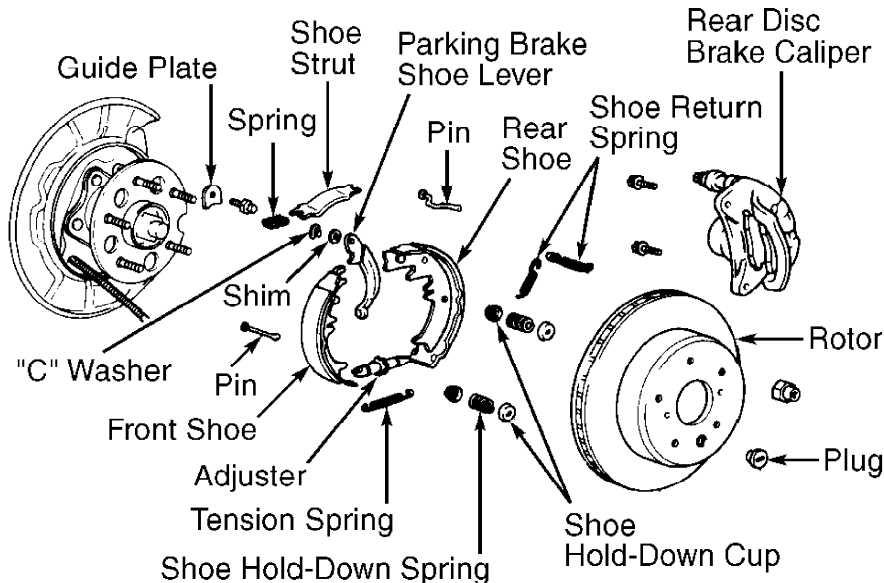
Remove rotor. See REAR BRAKE ROTOR. Remove shoe return springs and shoe strut with spring. See Fig. 8. Pull out on front shoe and remove adjuster. Remove front shoe hold-down spring, front shoe and tension spring. Remove rear shoe hold-down spring, rear shoe and pins. Disconnect parking brake cable from parking brake shoe lever.

Inspection

Clearance between parking brake shoe and lever must be .0138" (.350 mm) or less. If clearance is more than .0138" (.350 mm), replace shim under parking brake shoe lever. See Fig. 8. Shims are available from .012-.035" (.3-.9 mm) in .012" (.3 mm) increments. Use NEW "C" washer when installing lever. Check shoe lining thickness and brake disc inside diameter. See DISC & DRUM BRAKE SPECIFICATIONS.

Installation

To install, reverse removal procedure. Apply non-melting grease to sliding surfaces of shoes and adjuster threads. Align rotor-to-hub marks made during removal procedure. Adjust parking brake shoe clearance. See PARKING BRAKE under ADJUSTMENTS. To complete installation, reverse removal procedure.



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Fig. 8: Exploded View Of Rear Parking Brake Assembly
Courtesy of Toyota Motor Sales, U.S.A., Inc.

OVERHAUL

NOTE: When overhauling caliper, replace entire assembly if piston bores are pitted or scored more than light honing will repair.

FRONT BRAKE CALIPER

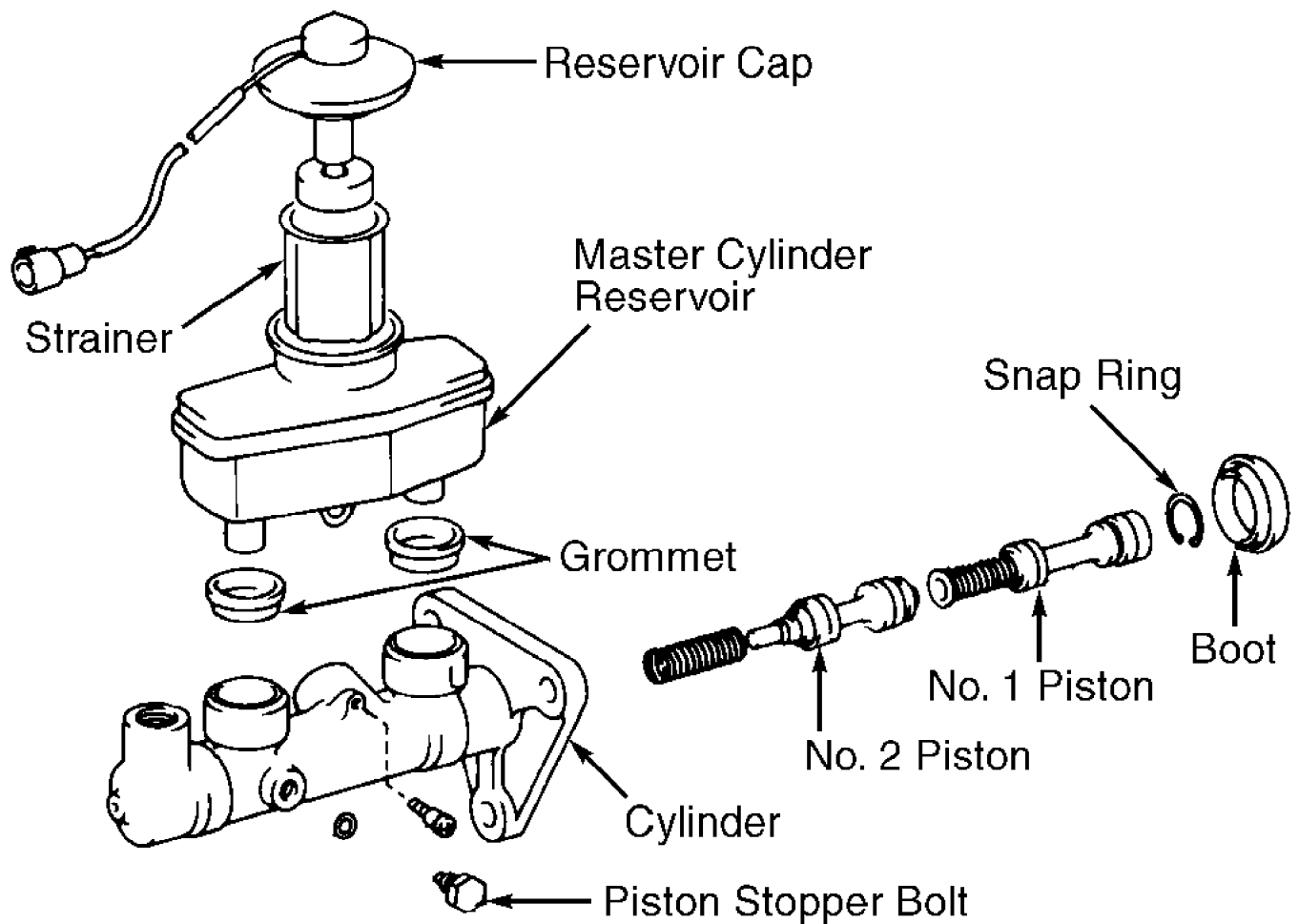
NOTE: For exploded view of front brake caliper assembly, see appropriate illustration. See Fig. 4 or 5.

REAR BRAKE CALIPER

NOTE: For exploded view of rear brake caliper assembly, see appropriate illustration. See Fig. 6 or 7.

MASTER CYLINDER

NOTE: For exploded view of master cylinder assembly, see Fig. 9.



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Fig. 9: Exploded View Of Master Cylinder Assembly (Typical)
Courtesy of Toyota Motor Sales, U.S.A., Inc.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Brake Hose-To-Caliper Fitting	22 (30)
Brakeline Fittings	11 (15)
Brake Pedal Push Rod Lock Nut	18 (25)
Caliper Guide Bolts	
Front	25 (34)
Rear	25 (34)
Caliper Torque Plate Bolts	
Front	87 (118)
Rear	77 (104)
Traction Control Pump Bolts	14 (19)
Wheel Lug Nuts	76 (103)
	INCH Lbs. (N.m)
Bleeder Plug	97 (11)
Master Cylinder Mounting Nuts	115 (13)
Master Cylinder Piston Stopper Bolt	89 (10)
Master Cylinder Reservoir Set Bolt	16 (1.8)
Parking Brake Lever Adjustment Lock Nut	48 (5.4)
Power Brake Unit Mounting Nuts	115 (13)
Traction Control Actuator Bolts	115 (13)

DISC & DRUM BRAKE SPECIFICATIONS

DISC & DRUM BRAKE SPECIFICATIONS TABLE

Application	In. (mm)
Non-Turbo	
Front Disc	
Standard Disc Thickness	1.260 (32.0)
Minimum Refinish Disc Thickness	1.181 (30.0)
Maximum Disc Runout .....	.0020 (.050)
Standard Pad Thickness .....	.433 (11.0)
Minimum Pad Thickness .....	.039 (1.00)
Rear Disc	
Standard Disc Thickness .....	.630 (16.0)
Minimum Refinish Disc Thickness .....	.591 (15.0)
Maximum Disc Runout .....	.0020 (.050)
Standard Pad Thickness .....	.394 (10.0)
Minimum Pad Thickness .....	.039 (1.00)
Turbo	
Front Disc	
Standard Disc Thickness	1.181 (30.0)
Minimum Refinish Disc Thickness	1.102 (28.0)
Maximum Disc Runout .....	.0020 (.050)
Standard Pad Thickness .....	.472 (12.0)
Minimum Pad Thickness .....	.039 (1.00)
Rear Disc	
Standard Disc Thickness .....	.630 (16.0)
Minimum Refinish Disc Thickness .....	.591 (15.0)
Maximum Disc Runout .....	.0020 (.050)
Standard Pad Thickness .....	.433 (11.0)
Minimum Pad Thickness .....	.039 (1.00)
Rear Parking Brake Drum	
Standard Diameter	7.48 (190)
Maximum Refinish Diameter	7.52 (191)

Standard Pad Thickness .....	.098 (2.50)
Minimum Pad Thickness .....	.039 (1.00)
Brake Shoe-To-Lever Side Clearance (Maximum) .....	.0138 (.350)
