

BRAKE SYSTEM

1993 Toyota Celica

1993 BRAKES
Toyota Disc & Drum - FWD Cars
Celica

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

DESCRIPTION & OPERATION

The hydraulic brake system uses a tandem master cylinder with vacuum power assist servo. All models are equipped with standard front disc and rear drum brakes. Rear disc brakes are available on Celica.

A proportioning valve is used to regulate brake pressure between front and rear brakes. Rear brakes on all models are self-adjusting.

Parking brake lever mechanically activates rear brakes. On models with rear drum brakes, a cable applies rear shoes. On Celica with rear disc brakes, parking brake is a duo servo mechanical drum brake design built into bell of rear rotor assemblies.

BLEEDING BRAKE SYSTEM

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 wheels in sequence. Start on wheel with longest hydraulic line, and work toward wheel with shortest hydraulic line.

2) Raise and support vehicle. Ensure brake fluid reservoir is at least half full 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 74 INCH lbs. (8 N.m). Ensure fluid leakage is not present. Add fluid to reservoir. Repeat procedure for remaining wheels.

ADJUSTMENTS

BRAKE PEDAL HEIGHT

1) Measure brake pedal height from face of pedal pad to asphalt sheet under carpet. See Fig. 1. If pedal height adjustment is necessary, loosen stoplight switch and lock nut on brake push rod. Turn push rod to adjust height. See BRAKE PEDAL HEIGHT SPECIFICATIONS table.

2) After setting pedal height, tighten lock nut on push rod. See TORQUE SPECIFICATIONS table at the end of this article. Adjust stoplight switch, and tighten switch lock nut. See STOPLIGHT SWITCH under ADJUSTMENTS.

BRAKE PEDAL HEIGHT SPECIFICATIONS TABLE

Application	In. (mm)
Celica	6.6-7.0 (168-178)

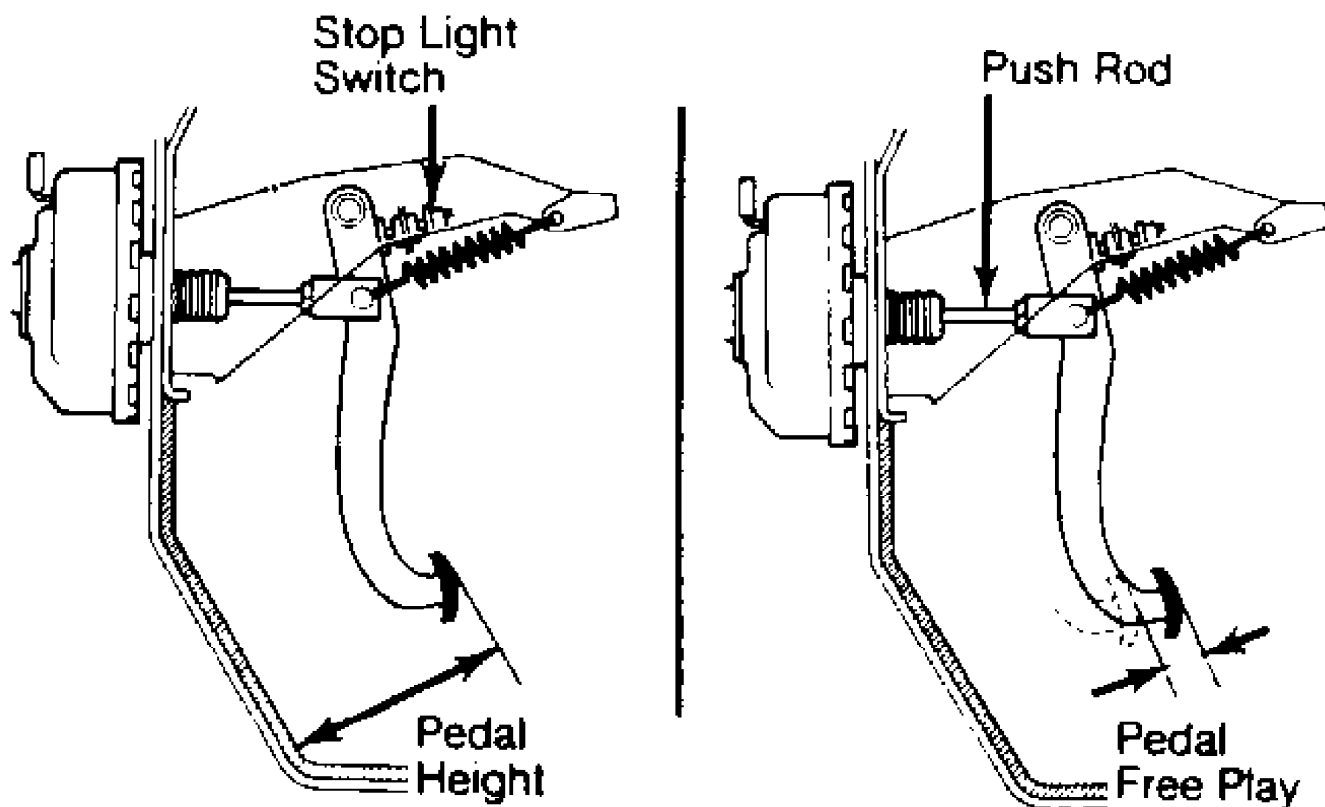


Fig. 1: Measuring Pedal Height & Free Play
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

BRAKE PEDAL FREE PLAY

1) Brake pedal free play is distance brake pedal travels with engine off before resistance is felt. See Fig. 1. To check pedal free play, depress brake pedal several times to exhaust vacuum from power brake unit.

2) Depress pedal until initial resistance is felt, and measure distance traveled. On all models brake pedal free play should be .04-.24" (1-6 mm). If free play is not as specified, adjust by turning push rod. Check brake pedal height. See BRAKE PEDAL HEIGHT under ADJUSTMENTS.

BRAKE PEDAL DEPRESSED HEIGHT

1) Measure pedal depressed height with engine running and weight of 110 lbs. (50 kg) applied against pedal. Measure pedal depressed height from face of pedal pad to asphalt sheet under carpet.

2) If measured depressed height is less than specification, inspect brake system. See BRAKE PEDAL MINIMUM DEPRESSED HEIGHT table.

BRAKE PEDAL MINIMUM DEPRESSED HEIGHT TABLE

Application	In. (mm)
With ABS	3.54 (90)
Without ABS	3.35 (85)

PARKING BRAKE (LEVER TYPE)

NOTE: Adjust rear brake shoe clearance before adjusting parking brake. See REAR BRAKE SHOES under ADJUSTMENTS.

Inspection

To check parking brake adjustment, pull parking brake lever with force of 44 lbs. (20 kg). Count number of notches (clicks). Adjust parking brake if lever stroke (number of notches) is not as specified. See PARKING BRAKE LEVER STROKE SPECIFICATIONS table.

Adjustment

Remove center console or parking brake lever boot to uncover base of lever. Loosen lock nut. Turn adjusting nut on cable until lever stroke is correct. Tighten lock nut. Install console or boot.

PARKING BRAKE LEVER STROKE SPECIFICATIONS TABLE

Application	Notches
Celica	4-7

REAR BRAKE SHOES

NOTE: All rear drum brakes have a self-adjuster, which is activated when brake pedal is applied as vehicle travels in Reverse.

Disc Brakes

Raise and support rear of vehicle. Remove rear wheel. Release parking brake. Remove adjustment hole plug from rear rotor. Turn adjuster until parking brake shoes lock rotor. Back off adjuster 8 notches.

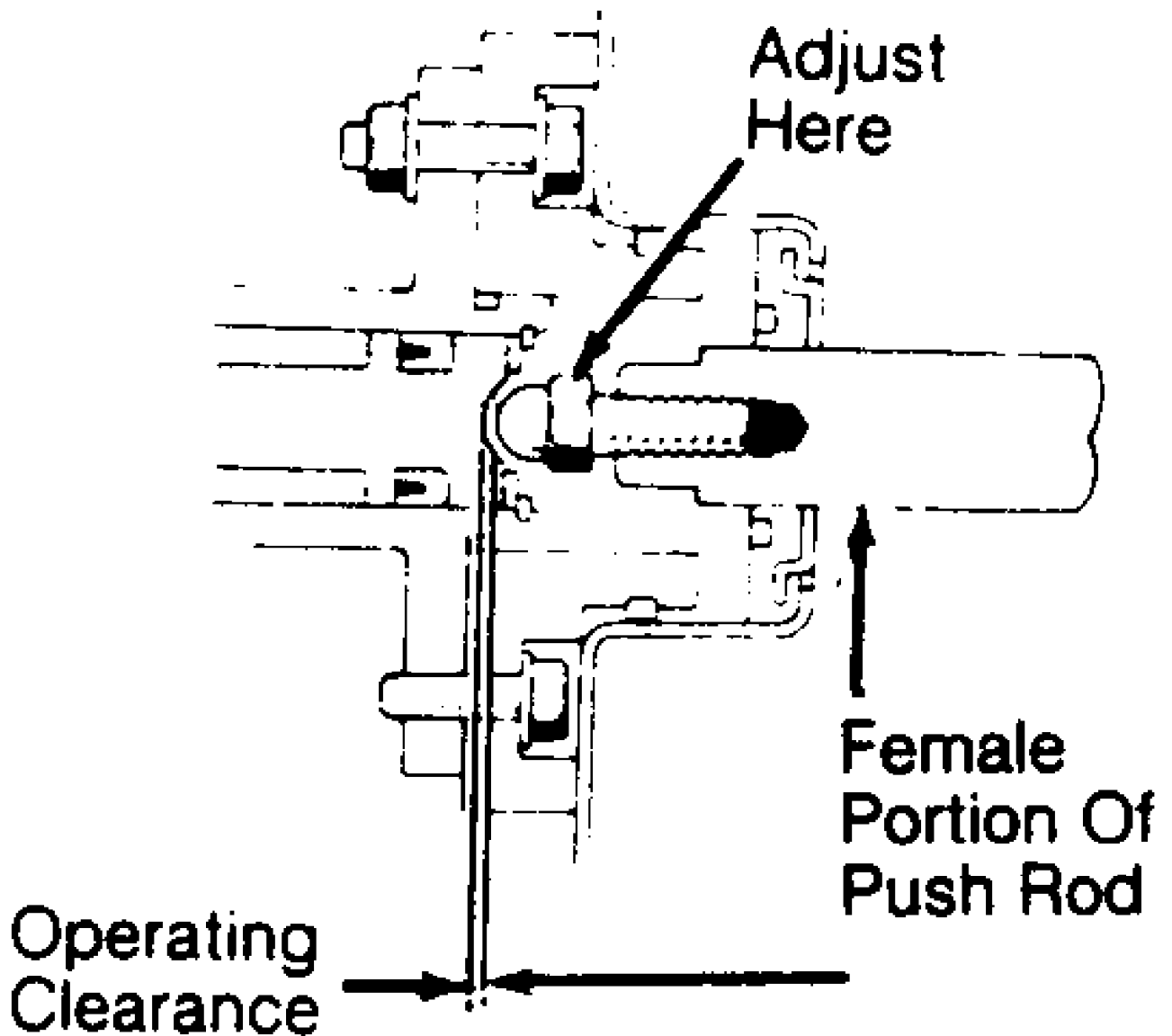
Drum Brakes

Raise and support rear of vehicle. Remove rear wheel. Release parking brake. Measure drum inner diameter and brake shoe diameter. Difference between drum and shoe diameters is clearance. Measured clearance should be .024" (.6 mm).

POWER BRAKE UNIT PUSH ROD

Check and adjust clearance between power brake unit push rod and master cylinder piston if either unit is replaced or overhauled. See Fig. 2. If clearance is not zero, adjust male portion of push rod

using open-end wrench while holding female portion of push rod with pliers.



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Fig. 2: Measuring Clearance Between Master Cylinder Piston & Power Brake Unit Push Rod
Courtesy of Toyota Motor Sales, U.S.A., Inc.

STOPLIGHT SWITCH

Remove lower instrument panel and air duct (if necessary).

Loosen lock nut. Turn switch until clearance between switch and pedal stop is .02-.09" (.5-2.3 mm). See Fig. 1. Check brake pedal height. See BRAKE PEDAL HEIGHT under ADJUSTMENTS. Check brakelight operation.

TESTING

POWER BRAKE UNIT

Functional Test

1) Start engine. Turn ignition off. Depress brake pedal several times. Depress pedal firmly and hold 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. Hold brake pedal in depressed position, and turn ignition off. If pedal height does not vary within 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 height should be low when first depressed. On consecutive applications, pedal height should gradually increase. If pedal height does not increase, check for air leaks.

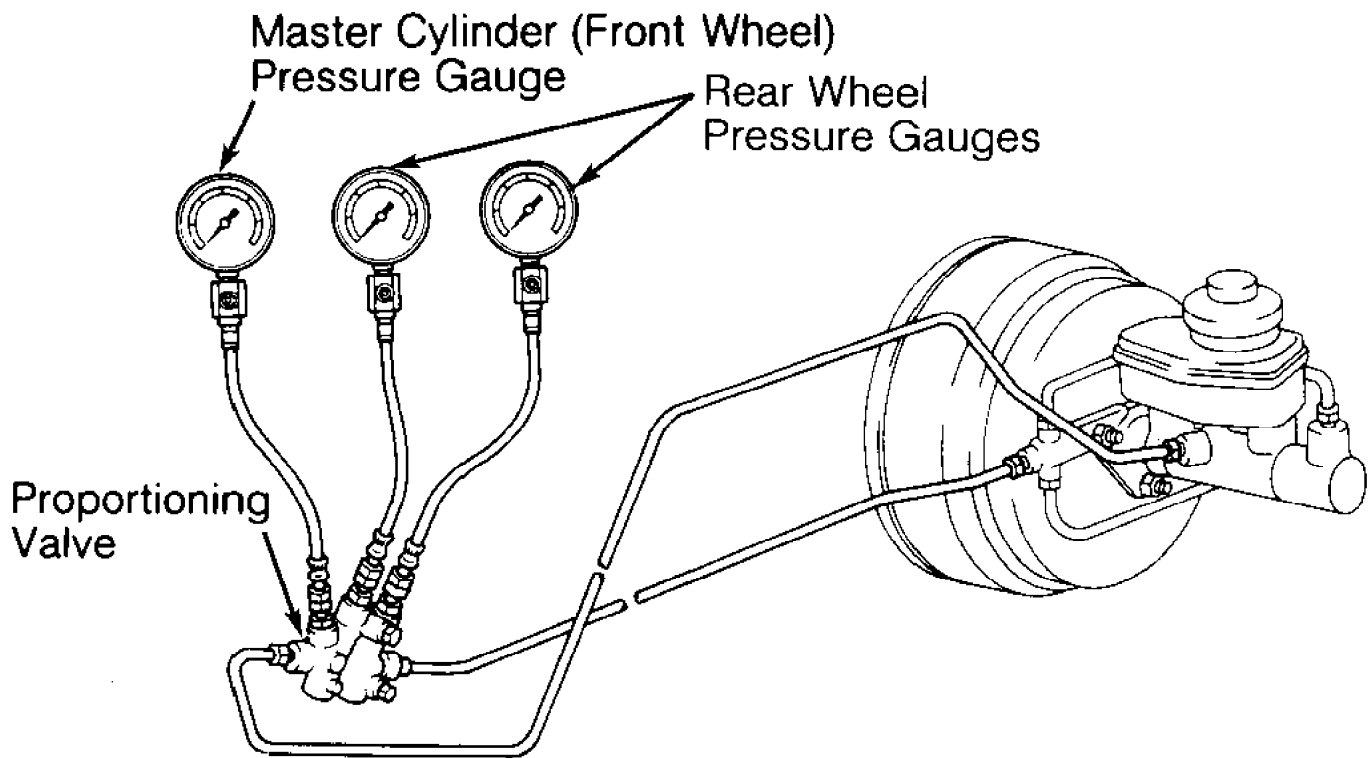
PROPORTIONING VALVE ("P" VALVE) (NON-LOAD-SENSING TYPE)

1) Install pressure gauges to "P" Valve. See Fig. 3. Bleed air from system. See BLEEDING BRAKE SYSTEM. Increase master cylinder (front) pressure to indicated value, and read rear wheel pressure gauges. See PROPORTIONING VALVE PRESSURE SPECIFICATIONS table.

2) Rear pressure increase should be less than front pressure increase. If rear wheel cylinder pressure as specified, replace valve assembly.

PROPORTIONING VALVE PRESSURE SPECIFICATIONS TABLE

Application	Front Pressure psi (kg/cm ²)	Rear Pressure psi (kg/cm ²)
3S-GTE	569 (40) 1280 (90)	569 (40) 832 (58.5)
4A-FE	427 (30) 1138 (80)	427 (30) 604.5 (42.5)
5S-FE		
Coupe & Liftback	427 (30) 1138 (80)	427 (30) 690 (48.5)
Convertible	356 (25) 1138 (80)	356 (25) 646 (45.4)
4WD	569 (40) 1280 (90)	569 (40) 832 (58.5)



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Fig. 3: Testing Proportioning Valve
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

REMOVAL & INSTALLATION

FRONT DISC BRAKE PADS

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

Removal

1) Raise and support vehicle. Remove wheel and tire assembly. Temporarily install wheel lug nuts to retain rotor position. Remove brake caliper from torque plate and wire aside; leave brakeline connected. See Fig. 4.

2) Remove anti-rattle springs (if equipped), anti-squeal shims and pads. Remove pad support plates and pad wear indicators. Check rotor thickness and runout. Measure brake pads and replace if necessary. See appropriate DISC & DRUM BRAKE SPECIFICATIONS table at end of article.

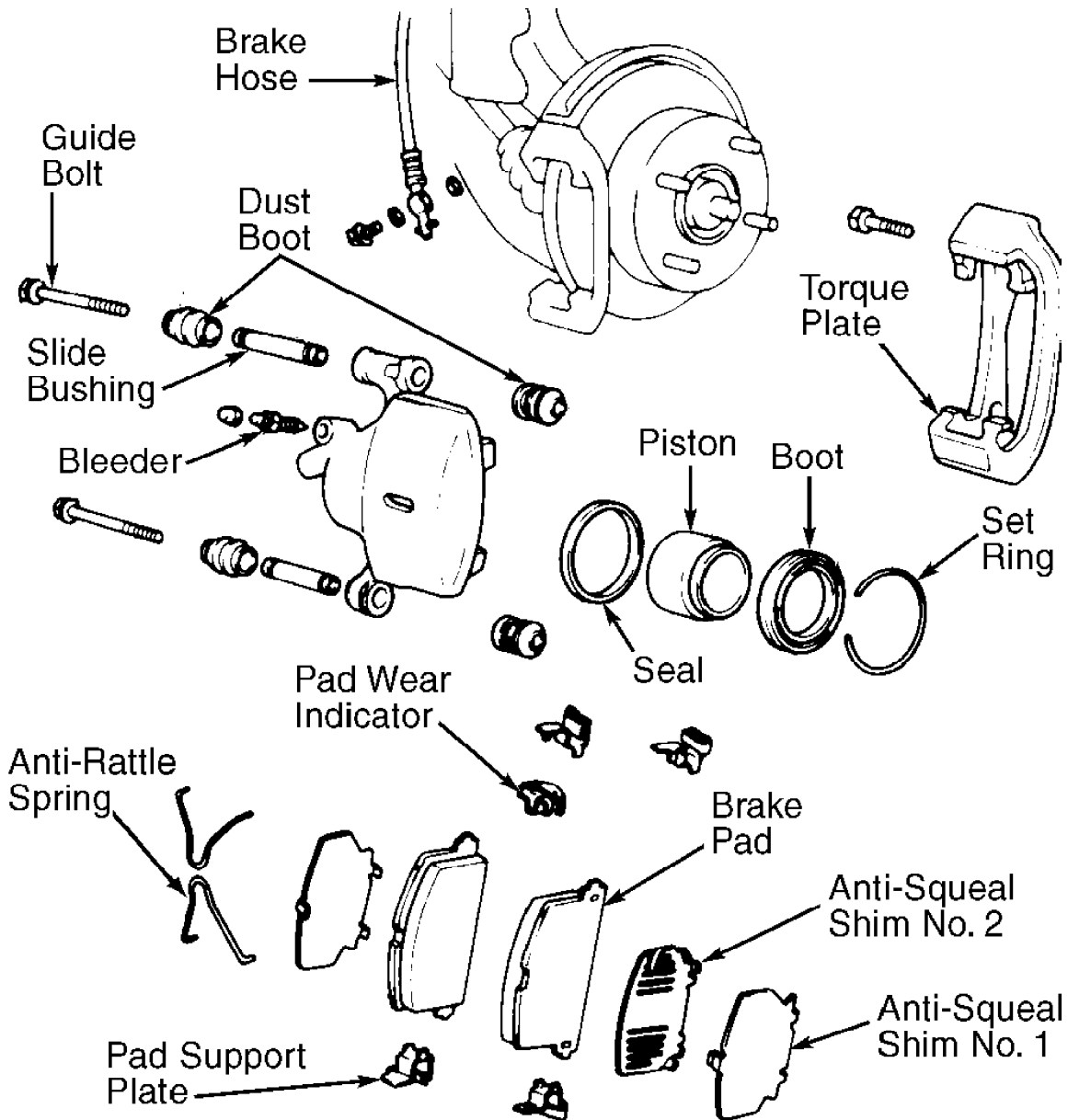
NOTE: Some models have one or more sets of anti-squeal shims. If one set of shims is vented, place it between pad and outer anti-squeal shim.

Installation

1) Install pad support plates and NEW pads. Install pad wear indicators, anti-squeal shims and anti-rattle springs (if equipped). Apply disc brake grease to inner anti-squeal shims. DO NOT allow grease to contact rubbing face of pads. Wear indicator must be on top side of pad.

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

2) Press 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 table at the end of this article. Check reservoir fluid level.



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

FRONT BRAKE CALIPER

Removal

Raise and support vehicle. Remove wheel and tire assembly. Disconnect brakeline from caliper. Plug brakeline to prevent fluid spillage. Remove caliper mounting bolts or slide pins if necessary. Remove caliper from torque plate.

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

Installation

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

FRONT BRAKE ROTOR

Removal & Installation

1) Remove caliper assembly with brakeline connected, and wire aside. See FRONT BRAKE CALIPER under REMOVAL & INSTALLATION. 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 table at the end of this article.

REAR DISC BRAKE PADS

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

Removal

1) Raise and support vehicle. Remove wheel and tire assembly. Temporarily install wheel lug nuts to retain rotor position. Remove brake caliper from torque plate and wire aside; leave brakeline connected.

2) Remove anti-squeal shims and pads. See Fig. 5. Remove pad support plates and pad wear indicators. Check rotor thickness and runout. Measure brake pads and replace if necessary. See appropriate DISC & DRUM BRAKE SPECIFICATIONS table at end of article.

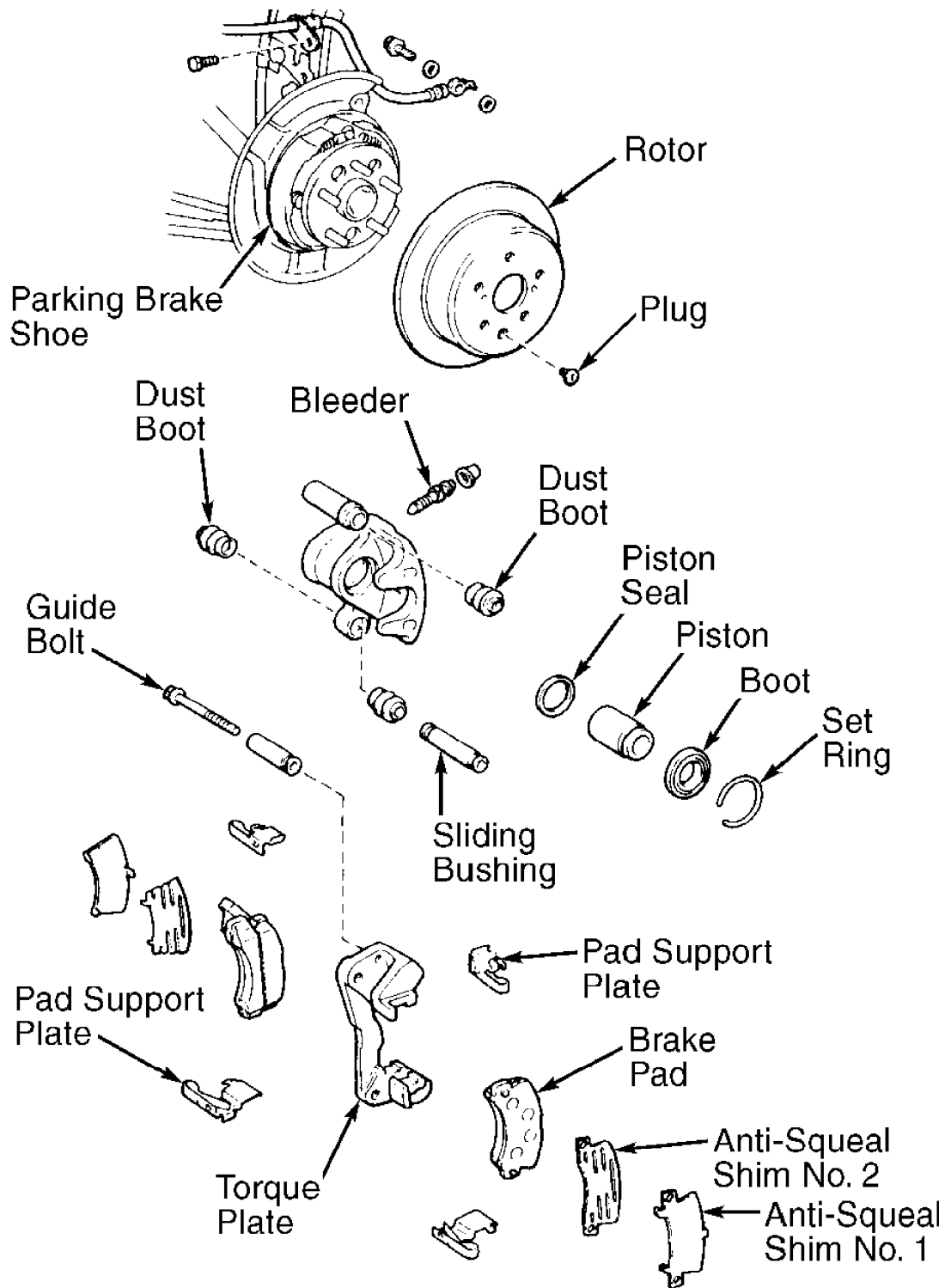
NOTE: Some models have one or more sets of anti-squeal shims. If one set of shims is vented, place it between pad and outer anti-squeal shim.

Installation

1) Install pad support plates and NEW pads. Install pad wear indicators and anti-squeal shims. 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 on Celica.

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

2) Press 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 table at the end of this article. Check reservoir fluid level.



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Fig. 5: Exploded View Of Rear Brake Caliper W/ Internal Shoe Parking Brake

Courtesy of Toyota Motor Sales, U.S.A., Inc.

REAR BRAKE CALIPER

Removal

Raise and support vehicle. Remove wheel and tire assembly. Disconnect brakeline from caliper. Plug brakeline to prevent fluid spillage. Remove caliper mounting bolts or slide pins if necessary. Remove caliper from torque plate.

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

Installation

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

REAR BRAKE ROTOR

Removal & Installation

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

2) Mark rotor and hub for installation reference. Slide rotor off hub assembly. To remove rotor, turn parking brake shoe adjuster to release shoes from rotor (if necessary). To install, reverse removal procedure. Tighten bolts to specification. See TORQUE SPECIFICATIONS table at the end of this article.

REAR BRAKE DRUM

Removal & Installation

Raise and support vehicle. Remove wheel and tire assembly. Remove set screws from brake drum (if equipped). Pull drum off hub assembly. To remove drum, turn parking brake shoe adjuster to release shoes from drum (if necessary). To install, reverse removal procedure. Check and adjust rear brake shoe clearance. See REAR BRAKE SHOES under ADJUSTMENTS.

REAR DRUM BRAKE SHOES

Removal

1) Raise and support vehicle. Remove wheel and tire assembly. Remove brake drum. See REAR BRAKE DRUM under REMOVAL & INSTALLATION. Disconnect return spring from front shoe. See Fig. 6. Remove front shoe hold-down spring, cup and pin. Remove anchor spring from front shoe, and remove front shoe.

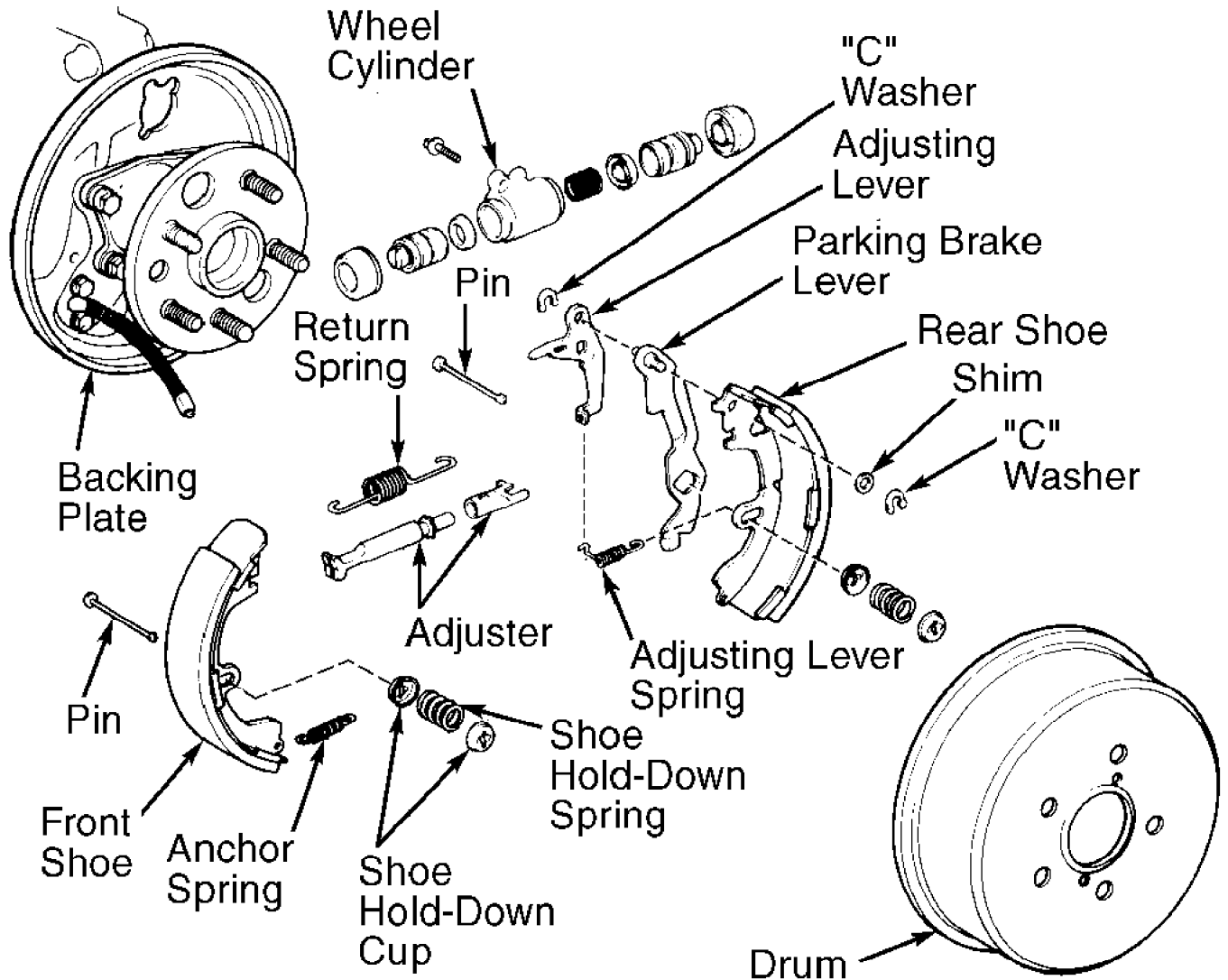
2) Remove anchor spring from rear shoe. Remove rear shoe hold-down spring, cup and pin. Disconnect parking brake cable from lever. Remove rear shoe, adjuster and levers as an assembly.

3) Remove adjusting lever spring. Remove adjuster and return spring from rear shoe. Remove "C" washers, adjusting lever and parking brake lever from rear shoe.

Installation

1) Install adjusting lever and parking brake lever to rear shoe with NEW "C" washers. Measure clearance between lever and rear shoe. Measured clearance must be .0138" (.350 mm) or less. If clearance is more than .0138" (.350 mm), replace shim under parking brake lever. See Fig. 6. Shims range from .008-.024" (.2-.6 mm), in .004" (.1 mm) increments; shims are also available in .035" (.9 mm) size. Install and stake "C" washers.

2) To complete installation, reverse removal procedure. Apply non-melting grease to sliding surfaces of shoes and adjuster threads. Check and adjust rear brake shoe clearance. See REAR BRAKE SHOES under ADJUSTMENTS.



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Fig. 6: Exploded View Of Rear Drum Brakes
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

REAR WHEEL CYLINDER

Removal & Installation

With brake drum and shoes removed, disconnect brakeline from wheel cylinder. Remove mounting bolts and remove wheel cylinder. To install, reverse removal procedure. Check and adjust rear brake shoe clearance. See REAR BRAKE SHOES under ADJUSTMENTS. Bleed brake system. See BLEEDING BRAKE SYSTEM.

REAR PARKING BRAKE (INTERNAL SHOE)

Removal (With Rear Disc Brake)

1) Remove rotor. See REAR BRAKE ROTOR under REMOVAL &

INSTALLATION. Remove shoe return springs and shoe strut with spring attached. See Fig. 7.

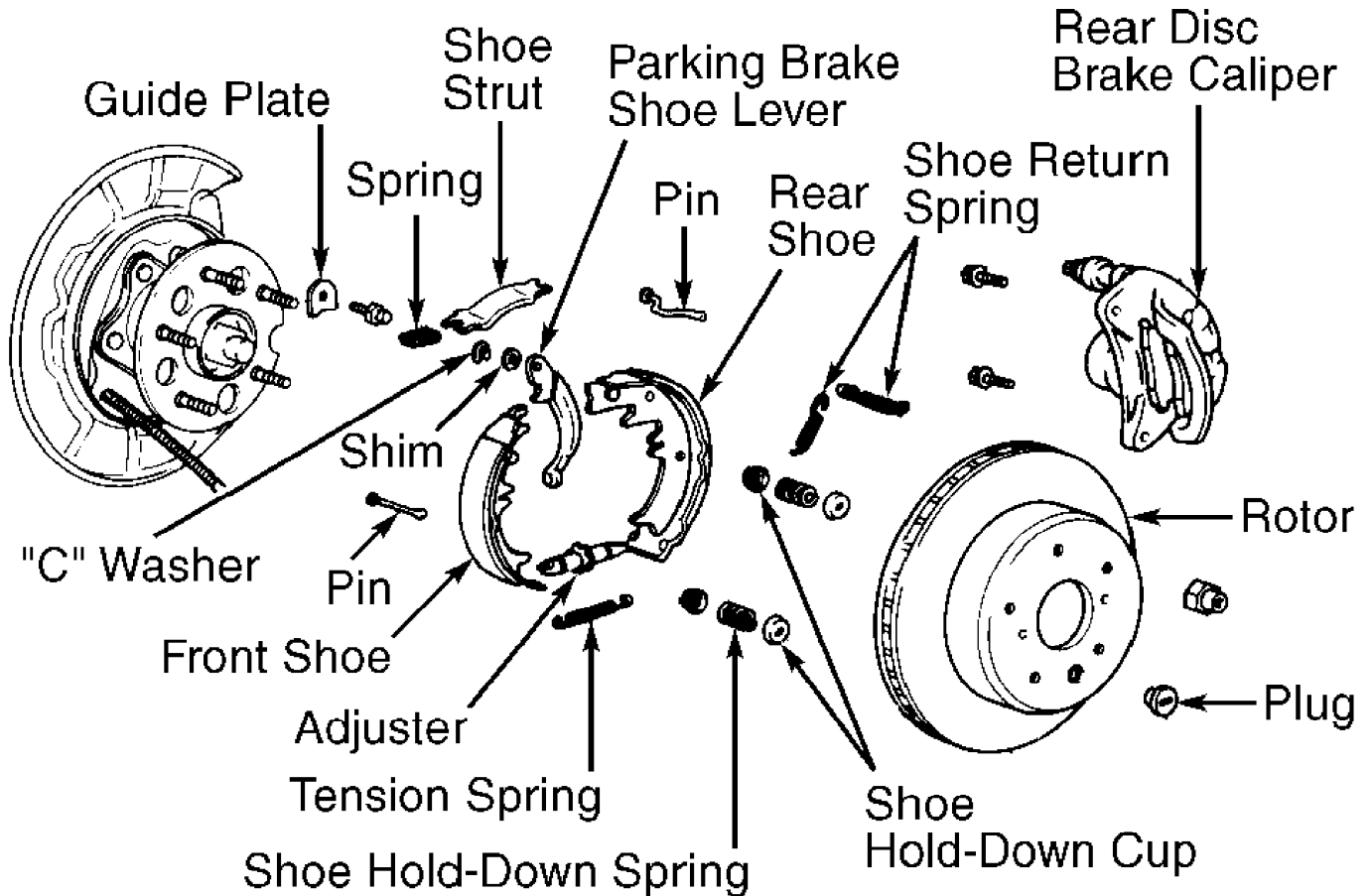
2) Pull out on front shoe, and remove adjuster. Remove tension spring from front shoe. Remove front shoe hold-down spring, cup and pin. Remove front shoe. Remove tension spring from rear shoe. Remove rear shoe hold-down spring, cup and pin. Disconnect parking brake cable from lever, and remove rear shoe.

Inspection (With Rear Disc Brake)

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 lever. See Fig. 7. Shims are available from .012-.036" (.3-.9 mm), in .012" (.3 mm) increments. Use NEW "C" washer when installing lever.

Installation (With Rear Disc Brake)

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



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Fig. 7: Exploded View Of Internal Parking Brake Assembly (W/ Rear Disc Brake)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

Removal

Remove air cleaner assembly. 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 table at the end of this article. Check and adjust power brake unit push rod. See POWER BRAKE UNIT PUSH ROD under ADJUSTMENTS. Bleed brake system. See BLEEDING BRAKE SYSTEM.

POWER BRAKE UNIT

Removal & Installation

1) Remove wiper arms. Remove outside lower windshield molding. Remove upper suspension brace. Temporarily secure shock absorber with nuts. Remove left wheel. Remove master cylinder. See MASTER CYLINDER under REMOVAL & INSTALLATION.

2) Remove charcoal canister, vacuum hose and lower pad. Disconnect push rod at brake pedal. Remove ignition coil, bracket and ignitor. Disconnect brakeline from flexible hose at left front brake. Remove brakeline grommet.

3) On ABS-equipped vehicles, remove 3 brakelines from clamp on firewall. On all models, remove power brake unit. To install, reverse removal procedure. Tighten nuts to specification. See TORQUE SPECIFICATIONS table at the end of this article. Check and adjust push rod. See POWER BRAKE UNIT PUSH ROD under ADJUSTMENTS. Bleed brake system. See BLEEDING BRAKE SYSTEM.

OVERHAUL

NOTE: When overhauling caliper, if cylinder bores are pitted or scored beyond repair by light honing, replace entire assembly.

FRONT BRAKE CALIPER

NOTE: For exploded view of front brake caliper assembly, see Fig. 4.

REAR BRAKE CALIPER

NOTE: For exploded view of rear brake caliper assembly, see Fig. 5.

REAR WHEEL CYLINDER

NOTE: For exploded view of rear wheel cylinder assembly, see Fig. 6.

MASTER CYLINDER

NOTE: For exploded view of master cylinder assembly, see Fig. 8.

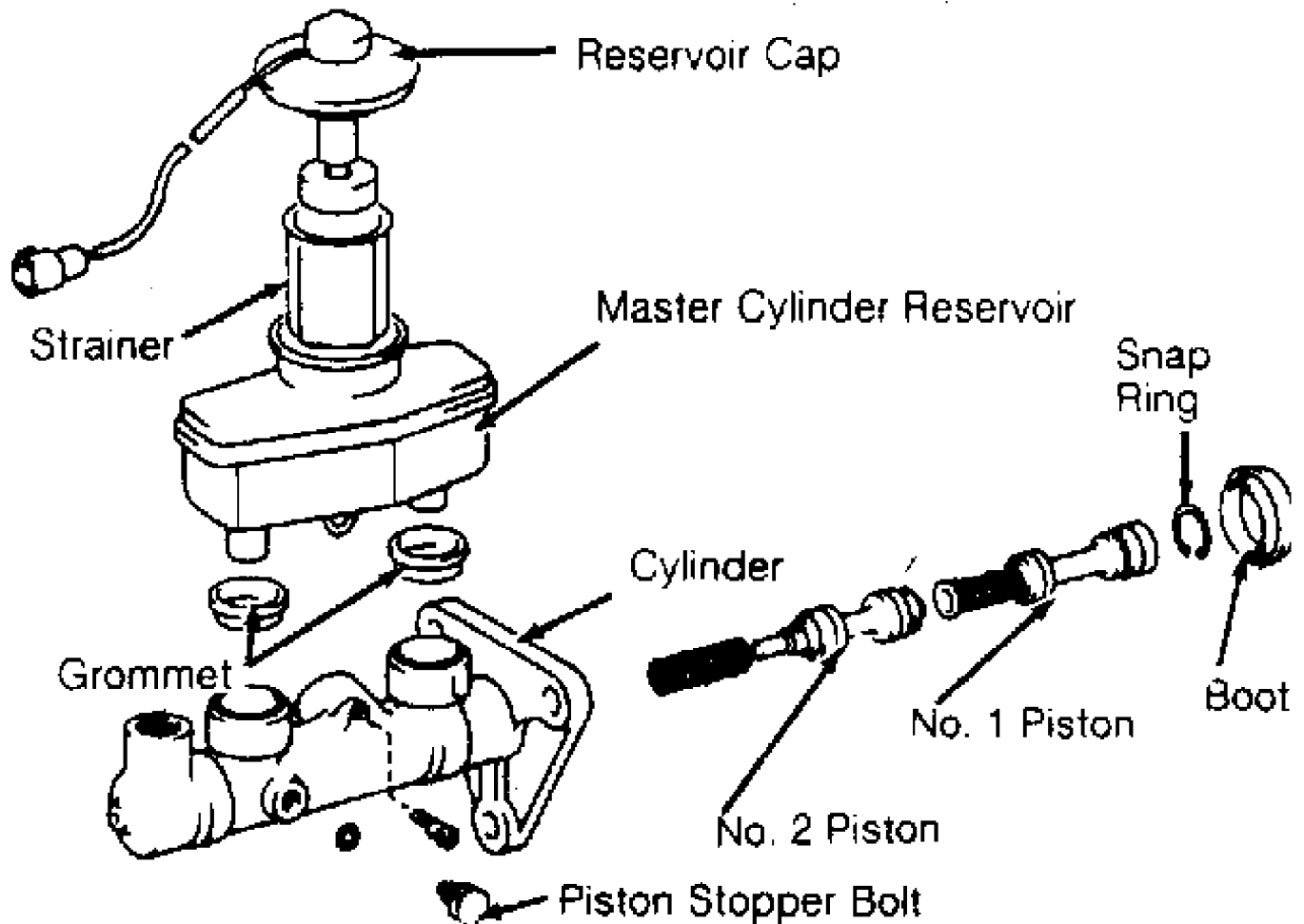


Fig. 8: Exploded View Of Master Cylinder Assembly (Typical)
 Courtesy of Toyota Motor Sales, U.S.A., Inc.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Axle Carrier Upper Bolt	166 (225)
Brake Hose-To-Caliper Fitting	22 (30)
Brakeline Fittings	11 (15)
Brake Pedal Push Rod Lock Nut	19 (26)
Caliper Guide Bolts	
Front	29 (39)
Rear	14 (19)
Caliper Torque Plate Bolts	
Front	79 (107)
Rear	34 (46)
Upper Suspension Brace	
Bolt	15 (20)
Nut	27 (37)
Wheel Lug Nuts	76 (103)

INCH Lbs. (N.m)

Bleeder Plug	74 (8)
Master Cylinder Mounting Nuts	115 (13)
Parking Brake Lever Adjustment Lock Nut	48 (5.4)
Power Brake Unit Mounting Nuts	115 (13)
Wheel Cylinder Mounting Bolts	89 (10)

DISC & DRUM BRAKE SPECIFICATIONS

DISC & DRUM BRAKE SPECIFICATIONS TABLE

Application	In. (mm)
Front Disc	
Standard Disc Thickness .....	.984 (25.0)
Minimum Refinish Disc Thickness .....	.906 (23.0)
Maximum Disc Runout .....	.0028 (.070)
Standard Pad Thickness .....	.394 (10.0)
Minimum Pad Thickness .....	.039 (1.00)
Rear Disc	
Standard Disc Thickness .....	.394 (10.0)
Minimum Refinish Disc Thickness .....	.354 (9.00)
Maximum Disc Runout .....	.0059 (.150)
Standard Pad Thickness .....	.394 (10.0)
Minimum Pad Thickness .....	.039 (1.00)
Rear Parking Brake Drum (Integral W/ Rear Disc)	
Standard Disc Diameter	6.69 (170.0)
Maximum Refinish Disc Diameter	6.73 (171.0)
Standard Pad Thickness .....	.079 (2.00)
Minimum Pad Thickness .....	.039 (1.00)
Brake Shoe-To-Lever Side Clearance (Maximum) .....	.0138 (.350)
Rear Brake Drum	
Standard Drum Diameter	7.874 (200.0)
Maximum Refinish Drum Diameter	7.913 (201.0)
Standard Pad Thickness .....	.157 (4.00)
Minimum Pad Thickness .....	.039 (1.00)
Brake Shoe-To-Drum Clearance .....	.024 (.600)
Brake Shoe-To-Lever Side Clearance (Maximum) .....	.0138 (.350)