Brakes

TOYOTA

Celica, Corolla, Corona, Cressida, Land Cruiser, Pickup, Starlet, Supra, Tercel

DESCRIPTION

Brake systems are hydraulically-actuated, using a tandem master cylinder, and vacuum power brake unit. Power units vary among models. Land Cruiser and Cressida models use a separate vacuum pump to provide vacuum to power brake unit.

Supra is equipped with 4-wheel disc brakes. All other models are equipped with front disc brakes, and rear drum brakes. A load sensing proportioning valve is installed in rear circuit of all pickup models (except Land Cruiser models).

Rear brakes on Pickup and Land Cruiser models require adjustment. All other models are self-adjusting. All parking brakes are cable-actuated, and operate on rear brakes except Land Cruiser. Parking brake on Land Cruiser operates on transfer case.

NOTE: Brake caliper applications vary among models. Check, and compare calipers with those shown in this article for correct service procedures.

ADJUSTMENTS

DRUM BRAKES

1) Raise, and support vehicle on safety stands. Release parking brake, and ensure wheel rotates freely. Remove plug from adjusting hole.

2) Turn adjusting screw with adjusting tool until wheel cannot be turned. Depress brake pedal, and ensure drum is locked.

3) On Land Cruiser, back off adjuster 4-5 notches or until wheel turns with slight drag. On all other models, back off adjuster 10-12 notches or until wheel turns freely.

BRAKE PEDAL HEIGHT

1) Brake pedal height is measured from center of brake pedal to asphalt sheet under carpet. To adjust clearance, loosen stop light switch, and lock nut on brake pedal push rod.

2) Adjust pedal height by turning push rod. After setting pedal height, tighten lock nut, adjust stop light switch, and tighten stop light switch lock nut. *See Fig. 1.*

BRAKE PEDAL HEIGHT

Application	Height In. (mm)
Celica, Corona & Supra	6.5-6.9 (165-175)
Corolla	6.9-7.3 (175-185)
Cressida	6.1-6.5 (154-165)
Land Cruiser	8.5 (215)
Pickup	6.2-6.6 (157-167)
Starlet	6.9 (175)
Tercel	6.4-6.5 (163-165)

BRAKE PEDAL FREE PLAY

1) Pedal free play is distance brake pedal travels before initial resistance of power brake push rod is contacted.

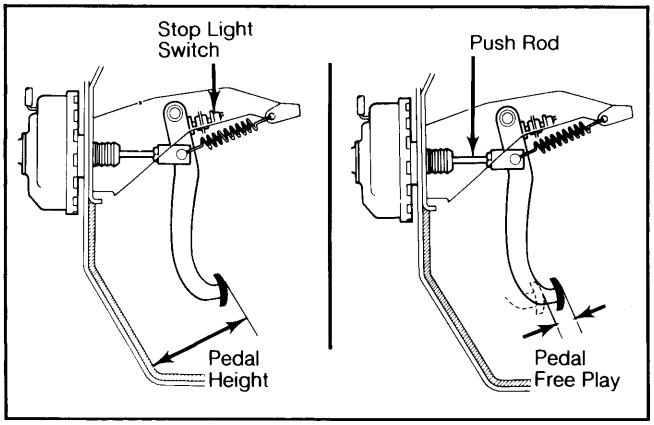
2) To adjust pedal free play, stop engine, and depress brake pedal several times to exhaust vacuum from power brake unit.

3) Place a straightedge beside brake pedal, then press pedal down with fingers until initial resistance is felt. *See Fig. 1.*

4) Free play should be .16-.28" (4-7 mm) for Tercel, and .12-.24" (3-6 mm) for all others.

5) If pedal travel is not as specified, adjust pedal height, start engine, and confirm free play measurement. Check brake pedal height.

Fig. 1: Measuring Pedal Height and Free Play



PARKING BRAKE

NOTE: Before adjusting parking brake, release parking brake lever. Pull parking brake, and count number of notches lever travels. If lever travel meets specifications, do not adjust parking brake. Pickup models require adjustment of service brakes before adjusting parking brake. On all other models, except Supra, if parking brake requires adjustment, first set brake shoe-to-drum clearance by depressing release knob on parking brake lever, and operating lever several times. Recheck lever travel.

Celica, Corolla & Starlet

1) If parking brake lever travel is not 3-6 notches, remove console (if equipped), release parking brake, loosen lock nut, and turn adjusting screw on lever until lever travel is correct.

2) Tighten lock nut, and install console (if equipped). Wheels should be locked when parking brake is applied, and rotate freely when lever is released.

Corona

1) If parking brake lever travel is not 3-7 notches, release parking brake, loosen lock nut on turnbuckle (under vehicle), and rotate turnbuckle until travel is correct.

2) Tighten lock nut. Wheels should be locked when parking brake is applied, and rotate freely when lever is released.

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Cressida

1) If parking brake lever travel is not 5-7 notches, release parking brake, and loosen lock nut on turnbuckle located under vehicle on right cable.

2) Rotate turnbuckle until .39" (10 mm) of threaded cable end is inside turnbuckle.

3) Tighten lock nut. Remove slack from rear cables by loosening lock nut on equalizer, and turning adjusting nut. Tighten lock nut.

4) Wheels should be locked when parking brake is applied, and rotate freely when lever is released.

Land Cruiser

1) Fully release parking brake, and turn adjusting cam on back of backing plate (at rear of transfer case) until brake shoes seat against drum.

2) Back off adjusting cam 1 notch at a time until drum locks when parking brake is applied, and spins freely when released.

3) After adjusting brake shoes, adjust parking brake travel to 12 notches by turning cable adjusting nut or turnbuckle.

4) Wheels should be locked when parking brake is applied,, and rotate freely when lever is released.

Pickup

1) If parking brake lever travel is not 7-15 notches, adjust parking brake, AFTER adjusting service brakes.

2) To adjust parking brake on 2-WD models, release parking brake, and turn adjusting nut on intermediate lever (under vehicle) until lever travel is correct.

3) Wheels should be locked when parking brake is applied, and rotate freely when lever is released.

4) To adjust parking brake on 4-WD models, release parking brake, and loosen lock nut stopper screw on operating lever on rear of backing plate.

5) Turn stopper screw until no play is evident at operating lever. Tighten stopper screw lock nut, then tighten 1 adjusting nut on intermediate lever while loosening other nut until lever travel is correct.

6) Tighten both adjusting nuts. After lever travel is correct, operating lever stopper screw MUST contact backing plate when lever is released.

Supra

1) If parking brake lever travel is not 5-8 notches, release parking brake, and depress brake pedal 2-3 times. Check parking brake lever travel.

2) If travel is not correct, release parking brake lever, loosen turnbuckle lock nut located under vehicle on right cable, and rotate turnbuckle to put slack in cable.

3) Tighten turnbuckle until parking brake operating lever on rear caliper begins to move. Tighten turnbuckle lock nut. Check parking brake operation.

NOTE: With either operating lever pushed away from caliper, it should not move when opposite operating lever is pushed away from caliper. If it does, cable is too tight, and parking brake must be readjusted.

Tercel

1) If parking brake lever travel is not 2-5 notches, release parking brake, and loosen lock nut on equalizer (under vehicle).

2) Turn adjusting nut until lever travel is correct. Wheels should be locked when parking brake is applied, and rotate freely when lever is released.

STOP LIGHT SWITCH

Stop light switch is located under dash, above brake pedal. To adjust, loosen lock nuts, and adjust switch so contact button just touches brake pedal. Tighten lock nut, and check pedal height.

BRAKE WARNING LIGHT

1) A dual warning light is mounted on dash of all vehicles except Pickups (single warning light).

2) On all models, light should glow when parking brake lever is pulled 1 notch, and go off when lever is fully released (ignition on).

3) To check circuit warning on all models except Pickups, release parking brake (ignition on), and ensure light is off.

4) Open bleeder screw on 1 wheel, and depress brake pedal; light should glow. Close bleeder screw, replenish brake fluid, and bleed hydraulic system.

LOAD SENSING PROPORTIONING VALVE

Land Cruiser & Pickups Only

1) Set rear axle load (including vehicle weight) to 1433 lbs. (650 kg) on 4-WD pickup, to 2646 lbs. (1150 kg) on Land Cruiser, and 1323 lbs. (600 kg) on all others.

2) Install a load proportioning gauge (09705-29017 or 09709-29017) to front caliper, and another to rear wheel cylinder on same side of vehicle.

3) Depress brake pedal and raise pressure on front gauge to 711 psi (50 kg/cm²). DO NOT depress brake pedal more than 1 time, and do not release pedal while setting front pressure reading.

4) After 2 seconds, rear brake pressure should be 398-540 psi (28-38 kg/cm²) on pickups, and 498-611 psi (35-45 kg/cm²) on Land Cruiser.

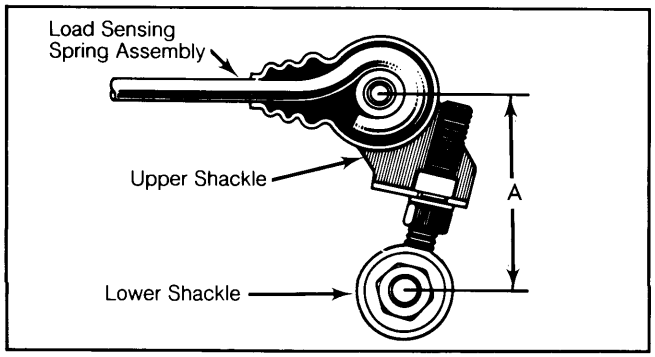
5) Depress brake pedal further and raise front brake pressure to 1138 psi (80 kg/cm²) on pickups, and 1422 psi (100 kg/cm²) on Land Cruiser.

6) Rear brake pressure should be 525-725 psi (37-51 kg/cm²) on pickups, and 725-925 (51-65 kg/cm²) on Land Cruiser.

7) If pressure readings do not meet specifications, adjust load sensing proportioning valve by adjusting length of lower shackle. *See Fig. 2.*

8) If rear pressure was low, lengthen distance "A". If rear pressure was high, shorten distance. Repeat test procedure, and check pressure readings.

Fig. 2: Adjusting Load Sensing Proportioning Valve



Turning the lower shackle one turn changes pressure reading 8.5 psi (.6 kg/cm²).

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9) If rear pressures do not conform to specifications after adjusting lower shackle, loosen valve body retaining nuts, and reposition valve body. If rear pressure was high, raise valve body.

10) If pressure was low, lower valve body. Tighten nuts, and adjust length of lower shackle to standard length.

11) Standard length for 4-WD pickup should be 4.72" (120 mm), and 3.07" (78 mm) for all other models. Repeat test procedure, and check pressures.

12) If pressures do not meet specifications, position valve body in upper most position, and depress brake pedal to obtain readings shown on Load Sensing Proportioning Valve Specifications table. If measured value does not meet specifications shown in table, replace valve assembly.

LOAD SENSING PROPORTIONING VALVE SPECIFICATIONS

Front Reading psi (kg/cm²)	Rear Reading psi (kg/cm²)
Pickup	
71 (5)	71 (5)
711 (50)	280-337 (19.7-23.7)
1138 (80)	424-509 (29.8-35.8)
Land Cruiser	
71 (5)	71 (5)
365 (25)	148-205 (10.4-14.4)
835 (60)	312-411 (21.9-28.9)

REMOVAL & INSTALLATION

NOTE: Front disc calipers used on Toyota vehicles may vary between manufacturer, and model. Refer to appropriate illustrations to assist in identification of caliper.

FRONT DISC BRAKE PADS

Removal ("F" Type)

1) Raise, and support vehicle. Remove tire and wheel. Remove spring clips, and guide. Remove cylinder, and suspend out of way without disconnecting hydraulic lines.

2) Remove anti-squeal spring. Remove brake pads, and guide plates. Remove anti-rattle springs, and pad support plates.

Installation

1) Install support plates. Install pad guide plates, and anti-rattle springs. Install brake pads, and anti-squeal shims.

2) Install cylinder over brake pads. Install cylinder guides, and clips. Apply grease to cylinder guides.

Removal ("K" Type)

1) Raise, and support vehicle. Remove tire and wheel. Remove guide plates, support springs, and pad support plates.

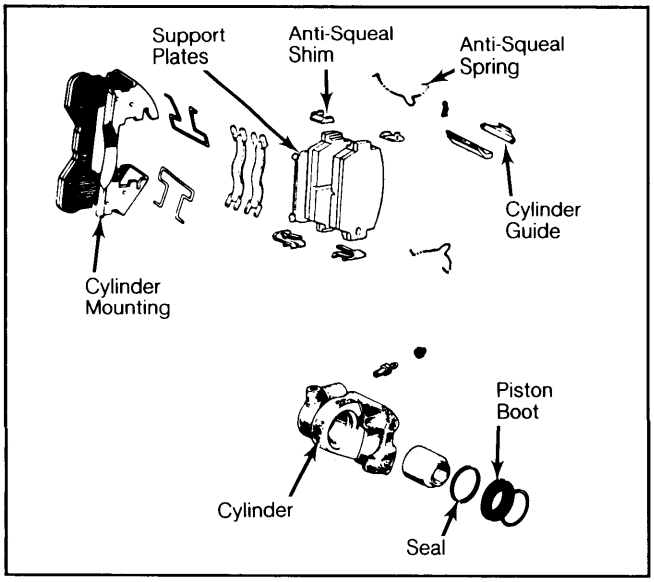
2) Remove cylinder with outer pad attached, and suspend from frame without disconnecting hydraulic line.

3) Remove outer pad anti-rattle spring. Remove outer pad and shim (if equipped). Remove inner pad and shim (if equipped) from cylinder mount. *See Fig. 4.*

Installation

1) Clean piston, and cylinder assembly, then seat piston in cylinder bore, opening bleeder screw if

Fig. 3: Exploded View of "F" Type Disc Brake Used On Celica and Supra



When reassembling apply grease to cylinder guides.

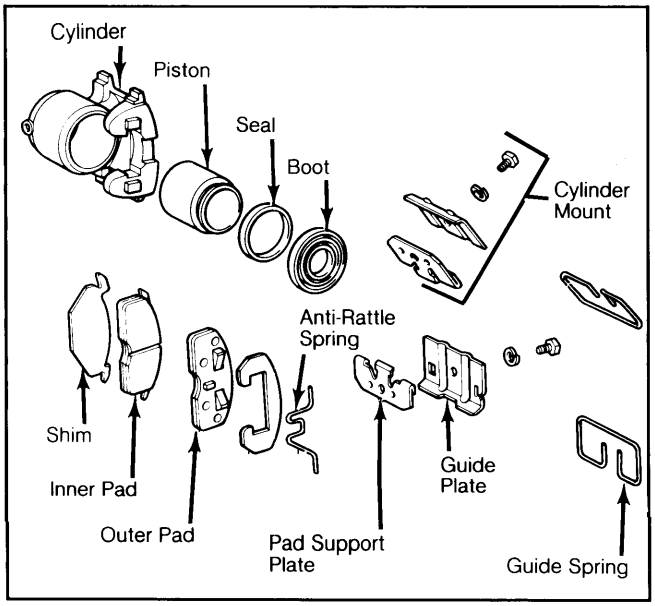
necessary. Install inner pad and shim (if equipped) to cylinder mount.

2) Install outer pad, shim (if equipped), and anti-rattle spring on cylinder. Apply brake grease to cylinder guides.

3) Install cylinder (with outer pad installed) over inner pad, then install pad support plates, support springs, and guide plates.

NOTE: Larger side of support springs MUST face away from vehicle.

Fig. 4: Exploded View of "K" Type Disc Brake Used on Cab, and Chassis Pickup



Removal (Girling)

Raise, and support vehicle. Remove tire and wheel. Remove clip, pins, anti-rattle spring, pads and shims.

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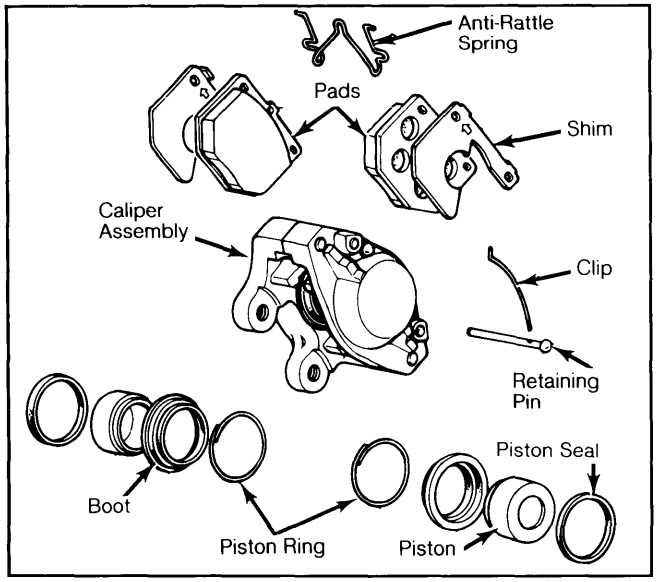
Fig. 5: Exploded View of Girling Type Disc Brake Used on Corona, and Standard Pickups



Install anti-squeal shim on piston side only.

Installation

1) Coat both sides of shim with brake grease. Remove small amount of brake fluid from master cylinder reservoir. Push pistons into cylinder bore.

2) Install shims with arrows pointing in direction of forward rotation of disc. Install pads, springs, pins, and clips. Refill master cylinder reservoir.

Removal (Corolla)

Raise, and support vehicle. Remove tire and wheel. Remove pad protector, anti-rattle springs, spring pins, pad and shims (if equipped). Clean dirt from pin portion of torque plate. *See Fig. 6.*

Installation

To install, clean piston assembly, and seat piston in cylinder bore. Insert pads, and shims (if equipped). Install retaining pins, anti-rattle springs, and protector.

Removal (Cressida)

Raise, and support vehicle. Remove tire and wheel. Remove cyliner slide pin on the sub pin side. Lift up cylinder, and remove pads, anti-squeal shim, and pad support plate. *See Fig. 7.*

Installation

1) Install pad support plate. Siphon a small amount of brake fluid from master cylinder reservoir. Seat piston in cylinder bore. Install inner pad.

2) Install anti-squeal shim to outer pad and install pad. Insulate cylinder boot and cylinder slide bushing with paper or rubber and lower cylinder. Install slide pin.

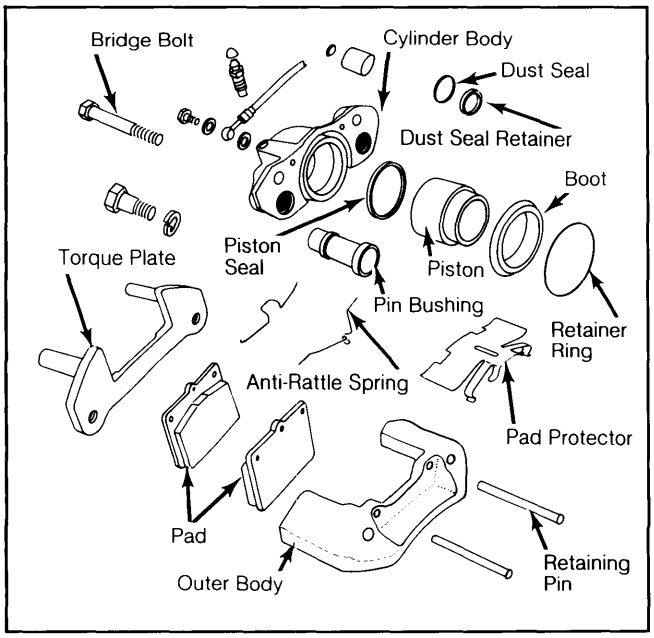
Removal (Land Cruiser & 4-WD Pickup)

Raise, and support vehicle. Remove tire and wheel. Remove clip, retaining pins, and anti-rattle spring. Pull disc pads from caliper cavity. *See Fig. 8.*

Installation

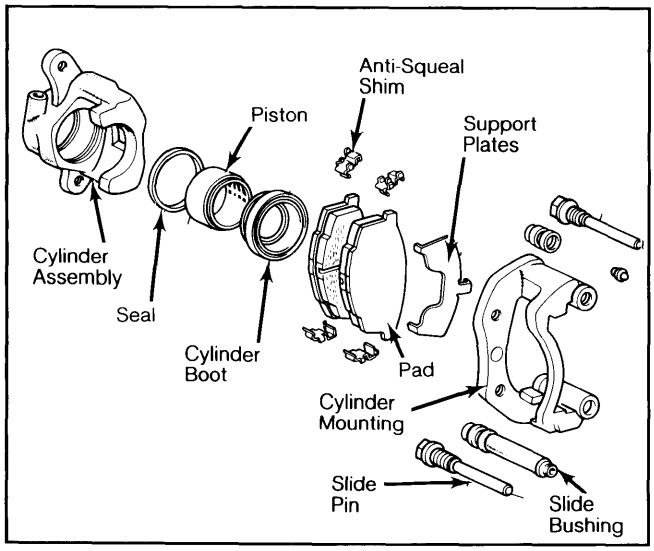
Siphon small amount of brake fluid from master cylinder reservoir. Seat pistons into cylinder bores. Install pads, anti-rattle spring, retaining pins, and clip. Refill master cylinder reservoir.

Fig. 6: Exploded View of Toyota or Sumitomo Type Disc Brake Used on Corolla



Install shims with arrows pointing in direction of forward rotation of disc.

Fig. 7: Exploded View of Cressida Disc Brake



Removal (Starlet & Tercel)

1) Raise, and support vehicle. Remove tire and wheel. Remove cylinder mounting bolts, and suspend caliper without disconnecting hydraulic line.

2) Remove inner pad, then remove outer pad with shim attached. Remove anti-rattle springs, pad guide plates and support plates. Remove inner shim from piston, and separate shim from outer pad. *See Fig. 9.*

Installation

1) Install support plate, guide plate, and anti-rattle plate to caliper. Assemble anti-squeal shim to outer pad. Depress anti-rattle spring, and assemble outer pad.

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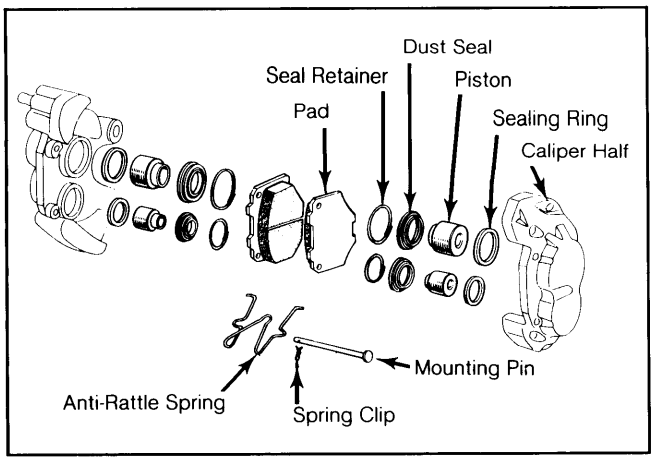
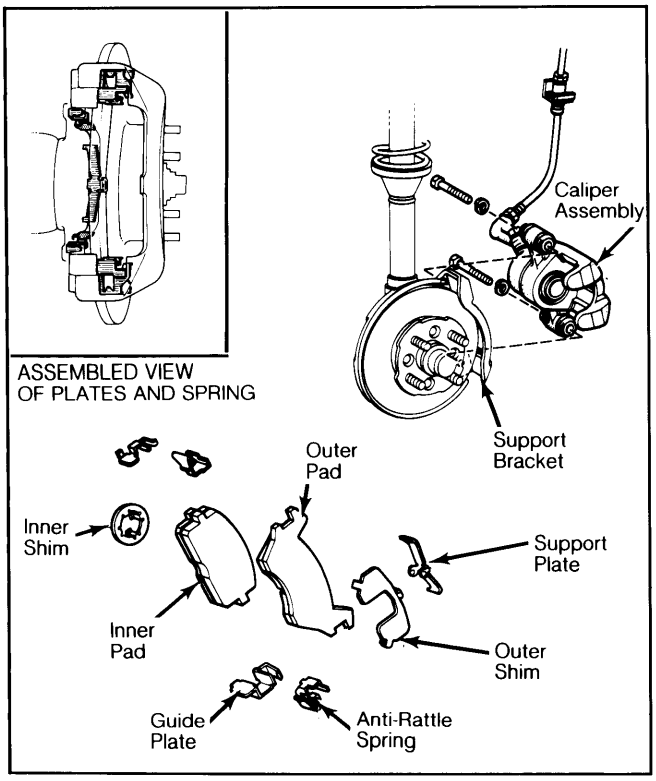
Fig. 8: Exploded View of Disc Brake Assembly Used on Land Cruiser and 4-WD Pickup



2) Draw out a small amount of brake fluid from master cylinder reservoir. Seat piston in cylinder bore. Assemble the anti-squeal shim to the piston. Install caliper, and tighten bolts. Refill master cylinder reservoir.

Fig. 9: Exploded View of Toyota Disc Brake Used on Starlet and Tercel



FRONT DISC BRAKE CALIPER

Removal ("F" Type)

Raise, and support vehicle. Remove tire and wheel. Remove spring clips, and guide plates. Disconnect hydraulic line, and remove caliper. Remove brake pads as previously outlined.

Installation

To install, apply brake grease to guides, and reverse removal procedure. Bleed hydraulic system.

Removal ("K" Type)

Raise, and support vehicle. Remove tire and wheel. Disconnect hydraulic line, and remove brake pads as previously outlined. Remove caliper.

Installation

To install, reverse removal procedure, and bleed hydraulic system.

Removal
(Cressida, Starlet, & Tercel)

Raise, and support vehicle. Remove tire and wheel. Disconnect hydraulic line, and remove caliper mounting bolts. Slide caliper off mounting bracket.

Installation

To install, apply rubber grease to retaining pin dust boots, and bushings. Reverse removal procedures, and install caliper with NEW pins. Bleed hydraulic system.

Removal (All Others)

1) Raise, and support vehicle. Remove tire and wheel. Remove brake pads as previously outlined.

2) Disconnect hydraulic line. Remove caliper mounting bolts, and lift off caliper.

Installation

To install, reverse removal procedure, and ensure mounting bolts are tightened. Bleed hydraulic system.

FRONT DISC BRAKE ROTOR

Removal (Land Cruiser & 4-WD Pickup)

1) Raise, and support vehicle. Remove wheel and caliper assembly. Remove hub grease cap, and snap ring. Remove free wheel nuts.

2) Using a tapered punch, tap on slits of cone washers to remove. Remove free hub. Remove axle hub and disc.

NOTE: Free wheel hub control handle must be set to "FREE" position for removal.

Installation

To install, reverse removal procedure. Adjust wheel bearings. *See Wheel Bearing Adjustment in SUSPENSION Section.*

Removal (Tercel)

1) Raise, and support vehicle. Remove tire and wheel. Remove cotter pin, and castellated cap. Depress brake pedal, and loosen bearing lock nut.

2) Remove caliper assembly as previously described, and suspend from frame without disconnecting hydraulic line.

3) Disconnect tie rod end using remover (09610-20011). Using a jack, raise left lower arm assembly. Remove stabilizer bar, and strut bar from lower arm.

4) Remove bolt securing lower arm to crossmember, and disconnect lower arm from crossmember. Remove bearing lock nut, and washer.

5) Using puller (09950-20013), pull hub from drive axle shaft. Remove shock absorber-to-steering knuckle retaining bolt. Separate shock absorber from knuckle.

6) Remove steering knuckle, and hub assembly from vehicle with lower arm attached.

NOTE: Before removing hub assembly, suspend drive axle shaft up so it does not fall or become damaged.

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7) Separate lower arm from steering knuckle. Remove inner dust shield, and remove oil seal. Using hub remover (09608-16031), force hub out of steering knuckle.

8) Place alignment marks on hub, and rotor for reassembly reference. Remove hub-to-rotor bolts, and separate hub from rotor.

Installation

1) Install new outer bearing if removed, and adjust bearing preload. *See Wheel Bearing Adjustment in SUSPENSION Section.* Align marks made during removal, and install hub to rotor.

2) Tighten hub-to-rotor bolts evenly. Install spacer in steering knuckle, then install inner bearing and race. Using installer (09636-20010), press steering knuckle onto hub with 2205 lbs. (1000 kg) of pressure.

3) With pressure still applied, rotate steering knuckle to settle bearings. Using a spring pull scale, measure frictional force of steering knuckle with pressure still applied. Frictional force should be 13-26 ozs. (370-750 g).

4) Increase pressure to 7716 lbs. (3500 kg), rotate steering knuckle to settle bearings, and measure frictional force. Force should be 13-40 ozs. (370-1120 g).

5) If frictional force is not to specification, insert thinner spacer to raise force or thicker spacer to lower force. Tap oil seal into steering knuckle until it is recessed .16" (4 mm) from end of steering knuckle.

6) Install dust shield, and coat oil seal lip with multi-purpose grease. Attach lower arm to steering knuckle. Place steering knuckle, and lower arm into position, and insert drive axle shaft into hub assembly.

7) Attach steering knuckle to shock absorber. Loosely install bearing washer, and lock nut. Loosely install strut bar to lower arm. Align stopper on shock absorber with steering knuckle.

8) Raise lower arm with a jack until steering knuckle contacts shock absorber stopper. Attach lower arm to crossmember, and loosely install retaining bolt. Insert bolt to retain steering knuckle to shock absorber, and tighten.

9) Connect stabilizer bar to lower arm, and tighten nut. Connect and tighten tie rod to steering knuckle. Install disc brake caliper, depress brake pedal, and tighten axle nut.

10) Bounce vehicle several times to settle suspension, then tighten lower arm-to-crossmember bolt, and strut bar with vehicle weight resting on suspension system. Check front alignment. *See WHEEL ALIGNMENT Section.*

Removal (All Others)

1) Raise, and support vehicle. Remove tire and wheel. Remove caliper. Remove hub grease cap, cotter pin, washer, and castellated nut. Carefully remove outer wheel bearing.

2) Remove rotor, and hub assembly, and place alignment marks on rotor, and hub for reassembly reference. Remove hub-to-rotor bolts, and separate hub from rotor.

Installation

To install, reverse removal procedure. Adjust wheel bearings. *See Wheel Bearing Adjustment in SUSPENSION Section.*

REAR DISC BRAKE PADS

Removal

1) Raise, and support vehicle. Remove tire and wheel. Remove parking brake cable from brake lever. Remove cylinder guides, and plates.

2) Remove cylinder, and hang out of way. DO NOT allow cylinder to hang by hydraulic line. Remove pad springs, shims, and springs. Remove anti-rattle springs, pad guide plates, and pad support plates.

Installation

1) Preset piston before installing pads by pushing, and turning piston clockwise until it retracts into cylinder body.

2) Install pad support plates, pad guide plates, and anti-rattle springs. Install pads, shims, and springs. Install cylinder, guides, and plates. Install parking brake cable.

NOTE: Piston stopper groove, and inner pad protrusion must be aligned.

REAR DISC BRAKE CALIPER

Removal

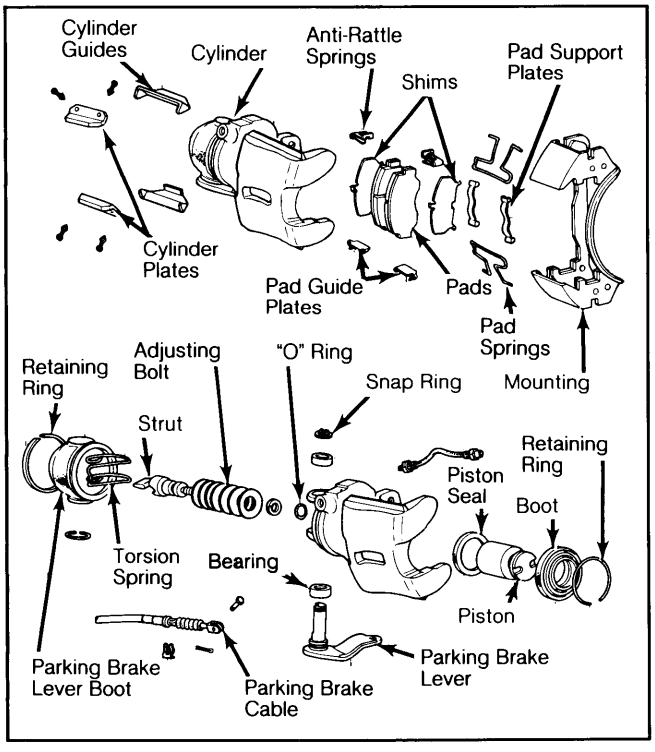
1) Raise, and support vehicle. Remove tire and wheel. Remove parking brake cable from brake lever.

2) Remove cylinder guides, and plates. Remove, and plug hydraulic line at cylinder. Remove cylinder, and mount.

Installation

To install, reverse removal procedure, and bleed brake system.

Fig. 10: Exploded View Supra Rear Disc Brake



REAR DISC BRAKE ROTOR

Removal & Installation

With wheel, and caliper removed, slide rotor off axle flange. To install, reverse removal procedure, and bleed brake system.

REAR BRAKE DRUM

Removal (All Models)

1) Raise, and support vehicle. Remove tire and wheel. Remove set screws from brake drum (if equipped).

TOYOTA (Cont.)

2) Pull drum from axle flange. It may be necessary to loosen brake adjustment before removing drum.

Installation

1) On all models (except Land Cruiser) set brake shoe-to-drum clearance by measuring inside diameter of brake drum, and diameter of brake shoes.

2) Turn brake adjuster until difference between diameters is .02" (.6 mm). Install brake drum, and adjust brakes if required.

BRAKE SHOES

Removal (Standard Pickup)

1) With brake drum removed, remove adjuster spring, and adjuster. Remove front hold down spring, and pin. Remove front shoe, and anchor spring.

2) Remove rear hold down spring, and pin, and remove rear shoe. Remove adjusting strut, and spring from adjusting lever.

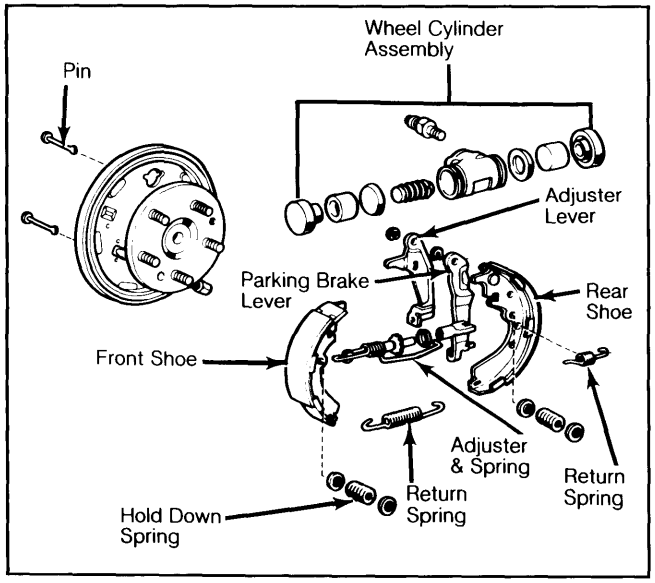
3) Disconnect parking brake cable from lever. Using a screwdriver, remove "C" washers retaining parking brake lever, and adjuster lever to rear shoe. Remove levers from shoe.

Installation

1) To install, reverse removal procedure and note the following: Install parking brake lever, and adjuster lever to rear shoe with new "C" washers.

2) After installation of brake assembly, move adjuster back and forth, and ensure adjusting bolt moves. If not, check installation of brake assembly. Bleed hydraulic system.

Fig. 11: Exploded View of Standard Pickup Rear Brake



When reassembling install new "C" washers.

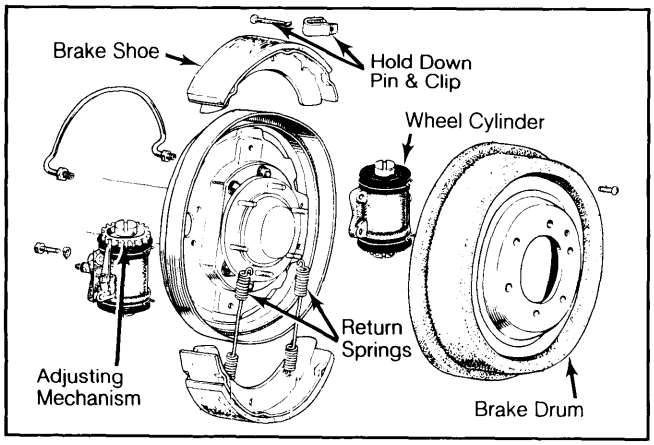
Removal (Land Cruiser)

With brake drum removed, remove tensioner spring. Remove hold down pins, and clips. Remove return springs, and remove brake shoes.

Installation

Position brake shoes over wheel cylinders with front return spring hooked on inner side of shoe. Install rear return spring to outer side of shoe. Install hold down pins, and clips. Adjust, and bleed brakes.

Fig. 12: Exploded View of Land Cruiser Rear Brake



Install front return spring hooked on inner side of of shoes, and rear return spring to outer side of shoes.

Removal (4WD Pickup & Cab and Chassis)

1) With brake drum removed, remove upper return springs. Remove adjuster cable, cable guide, adjuster lever, and anchor plate.

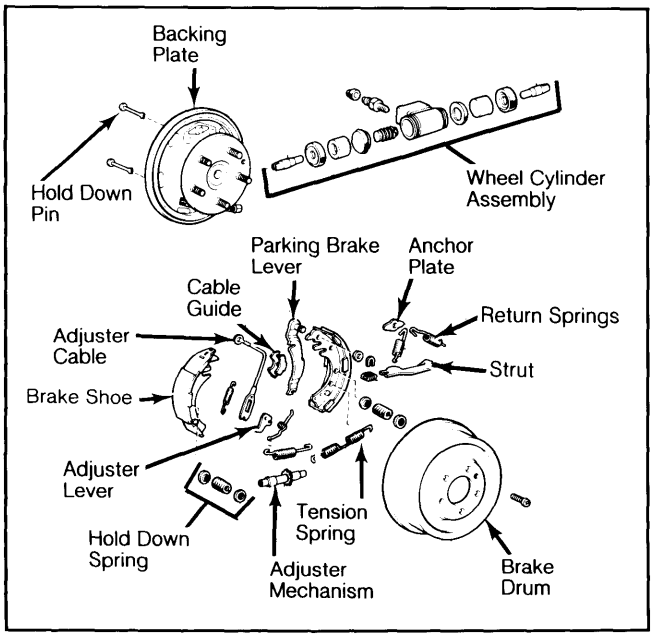
2) Remove adjuster lever tension spring, and strut. Remove hold down springs, and pins. Pull brake shoes from backing plate, and separate adjusting mechanism, and return spring.

3) Disconnect parking brake cable from lever. Mount rear shoe in vise, and remove "C" washer retaining parking brake lever to shoe. Remove parking brake lever.

Installation

1) To install, reverse removal procedure, and note the following: Adjuster mechanisms are not interchangeable. Left-hand thread — right wheel, right-hand thread — left wheel.

Fig. 13: Exploded View of Cab and Chassis and 4-WD Pickup Rear Brake



Adjusting mechanisims are not interchangable.

TOYOTA (Cont.)

2) After installation of brake assembly, pull adjusting cable backward, and release, adjusting bolt should move. If not, check installation of brake assembly. Install drum, and adjust brakes.

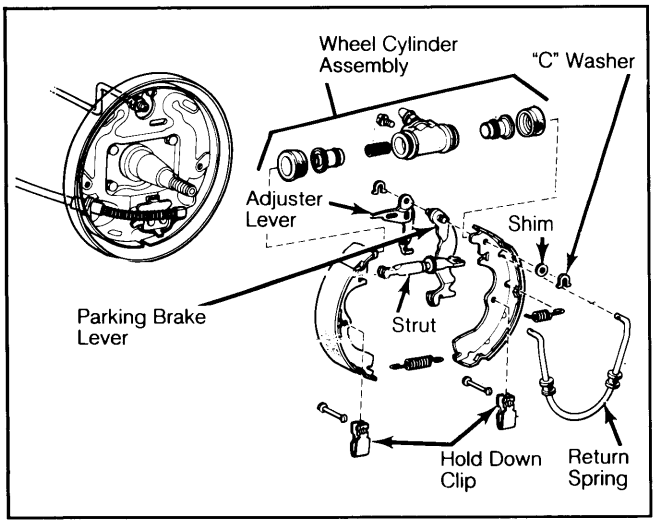
Removal (Starlet and Tercel)

1) With brake drum removed, remove return spring. Remove hold down springs, and pins. Disconnect front shoe from parking brake strut, and disconnect lower spring.

2) Remove front shoe. Disconnect parking brake lever return spring. Remove rear shoe from backing plate, and disconnect parking brake cable from lever.

3) Remove "C" washer retaining parking brake lever, and adjusting lever to rear shoe, then remove levers from rear shoe. Remove "C" washer retaining parking brake lever on adjusting lever, and separate levers.

Fig. 14: Exploded View of Tercel Rear Brake



Starlet rear brake assembly is similar.

Installation

1) Install parking brake lever onto adjusting lever with NEW "C" washer. Install lever asseembly on rear shoe, and retain in position temporarily with NEW "C" washer.

2) Measure clearance between adjusting lever, and rear of shoe. Remove "C" washer, and install correct shim(s) which will give a clearance of 0-.014" (0-.35 mm). Install, and stake "C" washer, and ensure lever moves.

3) Complete installation by reversing removal procedure, and note the following: Adjuster mechanisms are not interchangeable. Left-hand thread — left wheel, right-hand thread — right wheel. Install drum, and bleed hydraulic system.

NOTE: Shims are available in 6 sizes: .008" (.2 mm), .012" (.3 mm), .016" (.4 mm), .020" (.5 mm), .024" (.6 mm), and .035" (.9 mm). Shims may be installed in pairs to provide proper clearance.

Removal (All Others)

1) With brake drum removed, remove hold down pins, and clips. Remove anchor spring, and return spring. Remove front shoe, and adjuster strut.

2) Remove parking brake cable from parking brake lever. Remove rear shoe, parking brake lever, and adjusting lever as an assembly.

3) Remove "C" washer retaining parking brake lever, and adjusting lever to rear shoe, and separate levers from shoe.

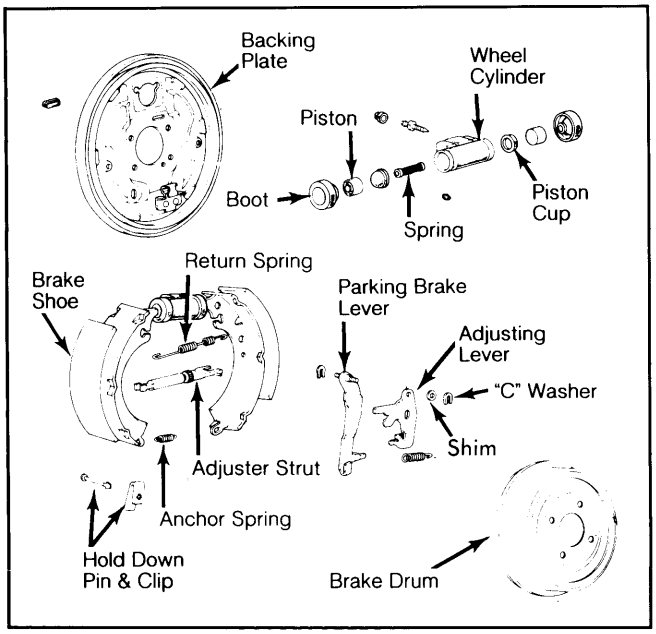
Installation

1) Install adjusting lever, and parking brake lever to rear shoe with NEW "C" washer. Measure clearance between lever, and shoe.

2) Remove "C" washer, and install correct shim(s) which will give a clearance of 0-.014" (0-.35 mm). Install, and stake "C" washer, and ensure lever moves.

3) Complete installation by reversing removal procedure, and note the following: Adjuster mechanisms are not interchangeable. Left-hand thread — right wheel, right-hand thread — left wheel. Install drum, and bleed hydraulic system.

Fig. 15: Exploded View of Rear Brake Used on Celica, Corolla, Corona, and Cressida



When reassembling install new "C" washers.

REAR BRAKE WHEEL CYLINDER

Removal (All Drum Brake Models)

With brake drum and shoes removed, disconnect hydraulic line from wheel cylinder. Remove mounting bolts, and remove wheel cylinder.

Installation

To install, reverse removal procedure. Adjusting mechanisms on many models are not interchangeable. Install adjusting mechanism to the wheel from which it was removed.

PARKING BRAKE

Removal (Land Cruiser)

1) Drain oil from transfer case. Disconnect front of drive shaft, and wire out-of-way. Remove drum mounting nut, and slide drum off splines.

2) Remove return springs and tension springs, then take off hold down springs, and pins. Disconnect parking brake cable from shoes.

Installation

To install, reverse removal procedure, and note: Make sure lower tension spring is installed so it lies between back plate and shoes. Refill transfer case with

TOYOTA (Cont.)

1.8 quarts of SAE 90. Tighten drum mounting nut, and adjust parking brake.

MASTER CYLINDER

Removal & Installation

Disconnect electrical lead (if equipped). Disconnect, and plug hydraulic lines. Remove master cylinder-to-power brake unit mounting nuts. Remove master cylinder. To install, reverse removal procedures, and bleed brake system.

VACUUM PUMP

Removal (Cressida & Land Cruiser)

Disconnect vacuum line from pump assembly. Disconnect, and plug oil lines. Remove mounting nuts, and gently pry pump off studs. Tap with a plastic hammer if necessary.

Installation

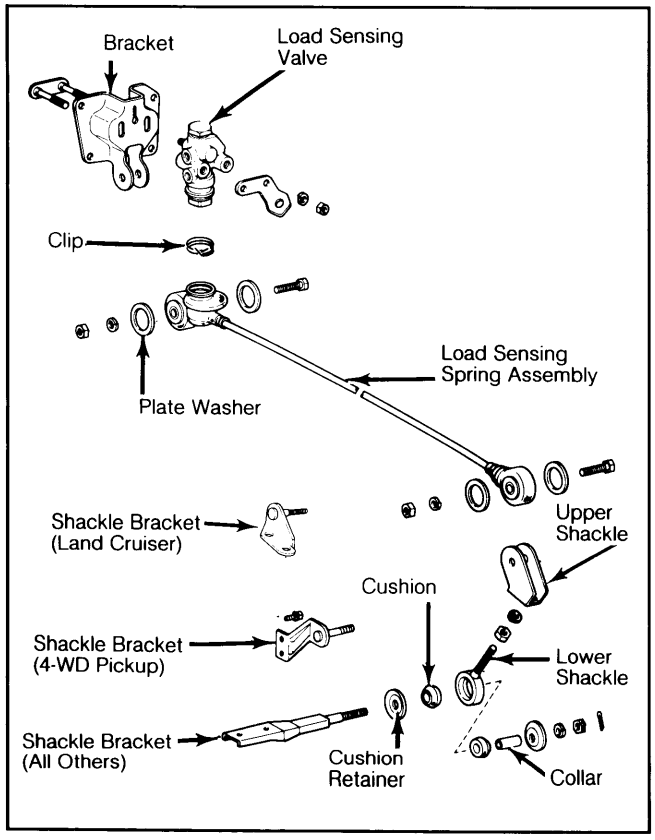
To install, reverse removal procedure, and note: Run engine at idle speed. Loosen screw at vacuum pump outlet, and check that oil is circulating.

POWER BRAKE UNIT

Removal & Installation

Remove master cylinder assembly from vehicle. Disconnect push rod clevis at brake pedal. Remove power booster attaching hardware, and remove booster assembly from vehicle. To install, reverse removal procedure.

Fig. 16: Exploded View of Load Sensing Proportioning Valve



Do not disassemble valve body.

LOAD SENSING PROPORTIONING VALVE

Removal

1) Raise, and support vehicle. Remove load sensing spring assembly. Disconnect and plug hydraulic lines from load sensing valve.

2) Remove brake tube bracket from valve body and bracket as an assembly. Separate valve body from bracket. *See Fig. 16.*

NOTE: DO NOT disassemble valve body.

Installation

1) To install, reverse removal procedure, and note the following: Apply rubber grease to all rubbing areas.

2) Install new rubber plate on valve body side of spring. Adjust length of upper, and lower shackle to original height.

3) After installation, position valve body so valve piston lightly contacts load sensing spring. Bleed hydraulic system, and check brake pressures.

NOTE: DO NOT mistake valve side of load sensing spring for shackle side.

OVERHAUL

NOTE: When overhauling caliper, wheel cylinder, or master cylinder assemblies, all rubber components should be replaced. If cylinder bores are pitted, or scored more than light honing will repair, entire assembly should be replaced.

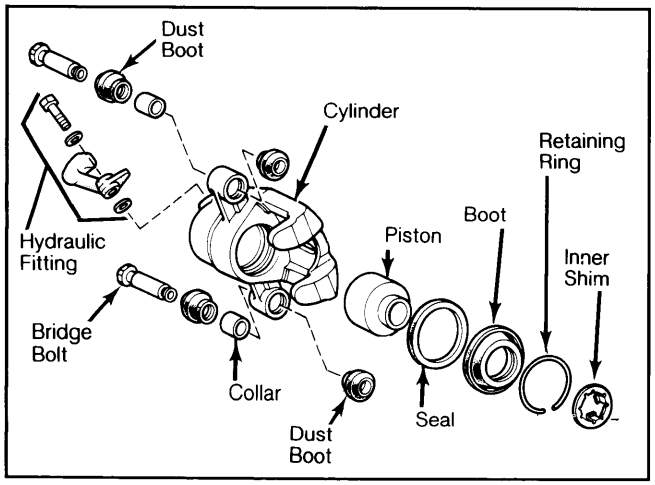
DISC BRAKE CALIPER

Disassembly ("F" & "K" Types, Starlet & Tercel)

1) Remove retainer ring (if equipped), and boot. Apply light air pressure to fluid inlet port to remove piston from cylinder.

2) Remove seal from cylinder without damaging bore. *See Figs. 3, 4, 9, 17.*

Fig. 17: Exploded View of Starlet and Tercel Caliper Assembly



TOYOTA (Cont.)

Cleaning & Inspection

Clean all parts in clean brake fluid. Inspect bore, and piston for excessive wear or damage. Replace defective parts.

Reassembly

1) Coat piston, seal, and cylinder bore with rubber grease before reassembly.

2) To reassemble, reverse disassembly procedure, and note the following: On "K" type, install seal, fit boot to piston, then fit boot to cylinder, and push piston into cylinder bore.

Disassembly (Corolla)

1) Loosen both bridge bolts (caliper half mounting bolts), and separate cylinder casting from outer body. Pull out torque plate. Remove retainer ring, and boot.

2) Force light air pressure through fluid inlet port to remove piston. From caliper, remove following: Piston seal, bushings, hole plug, retainers, and dust seals. *See Fig. 6.*

Cleaning & Inspection

1) Clean all parts in alcohol or clean brake fluid. Inspect parts for excessive wear or damage. Replace defective parts.

2) If torque plate pins are excessively worn or if pin weld parts are abnormally corroded, caliper must be replaced.

Reassembly

1) Ensure torque plate pins, and bushing bores are clean, and coat with grease furnished in repair kit. Coat piston seals, and cylinder bore with rubber grease.

2) Fit dust seal, retainers, and bushings to cylinder. Fit piston seal on cylinder, and push piston in by hand. Install dust boot, and ring.

3) Reassemble torque plate pins in cylinder body. Make sure torque plate is free to slide smoothly. Install bridge bolts, and tighten.

Disassembly (Land Cruiser & 4-WD Pickup)

1) Remove dust seal retainer ring, and seal. Insert small block of wood into cylinder cavity.

2) Apply light air pressure to one side of cylinder to remove piston. Repeat procedure on opposite side. Remove piston seals without damaging bores. *See Fig. 8.*

NOTE: DO NOT separate caliper halves.

Cleaning & Inspection

Clean all parts in clean brake fluid. Inspect pistons, and cylinder bores for excessive wear, damage or corrosion. Replace defective parts.

Reassembly

1) Lightly coat all parts with rubber grease. Insert new piston seal, being careful that seals are properly seated in grooves.

2) Fit piston, and slide dust seal into position. With dust seal seated, fit retainer ring.

Disassembly (Supra Rear Caliper)

1) Remove dust boot retaining ring, and boot. Remove piston by turning it counterclockwise with remover (09719-14010). Remove piston seal from cylinder groove without damage to cylinder bore. *See Fig. 10.*

2) Remove retaining ring from parking brake lever boot. Pull boot back over parking brake lever, and remove shaft retaining ring. Using arbor press, and remover (09719-14010), remove parking brake lever, and separate boot from lever.

3) Remove torsion spring and strut. Mount caliper assembly in padded vise and remove bearings. Separate components, and arrange for reassembly reference.

Cleaning & Inspection

Wash all parts in clean brake fluid. Inspect all parts for excessive wear, damage or corrosion. Replace defective parts.

Reassembly

1) Coat all parts with rubber grease. Install bearings. Fit new "O" ring, and spring washer on adjusting bolt. Ensure "O" ring and washer do not touch.

2) Install adjusting bolt and strut into bore with strut against raised side of bolt. Strut must be angled toward torsion spring retaining pin.

3) Install torsion spring with formed loop seated around retaining pin. Fit rubber boot to parking brake lever. Install parking brake lever with arbor press, and tool (09719-14010).

4) Install shaft retaining ring. Pull boot over lever assembly, and install retaining ring. Install piston seal into cylinder bore.

5) Install piston into cylinder bore by turning it clockwise with installer (09719-14010). Align piston with piston stopper groove. Install dust boot, and retaining ring.

Disassembly (All Others)

1) Remove dust boot retainer ring, and dust boot. Insert small wooden block between pistons.

2) Apply light air pressure to fluid inlet port to remove pistons. Remove seals without damaging bores. *See Fig. 5.*

NOTE: DO NOT separate caliper halves.

Cleaning & Inspection

Clean all parts in clean brake fluid. Inspect bores, and pistons for excessive wear or damage. Replace defective parts.

Reassembly

Coat piston seals, cylinder bores, and pistons with brake grease. To reassemble, reverse disassembly procedure.

MASTER CYLINDER

Disassembly

1) Remove reservoir(s), hose, and switches (if equipped). Mount cylinder in a soft-jawed vise. Remove dust boot, and check valves.

2) Push pistons into cylinder bore, and remove stop bolt. Remove snap ring, and withdraw piston assemblies.

3) Remove unions, outlet plugs, and other external components. Disassemble piston assemblies by removing springs, retainers, and cups. *See Fig. 18.*

Cleaning & Inspection

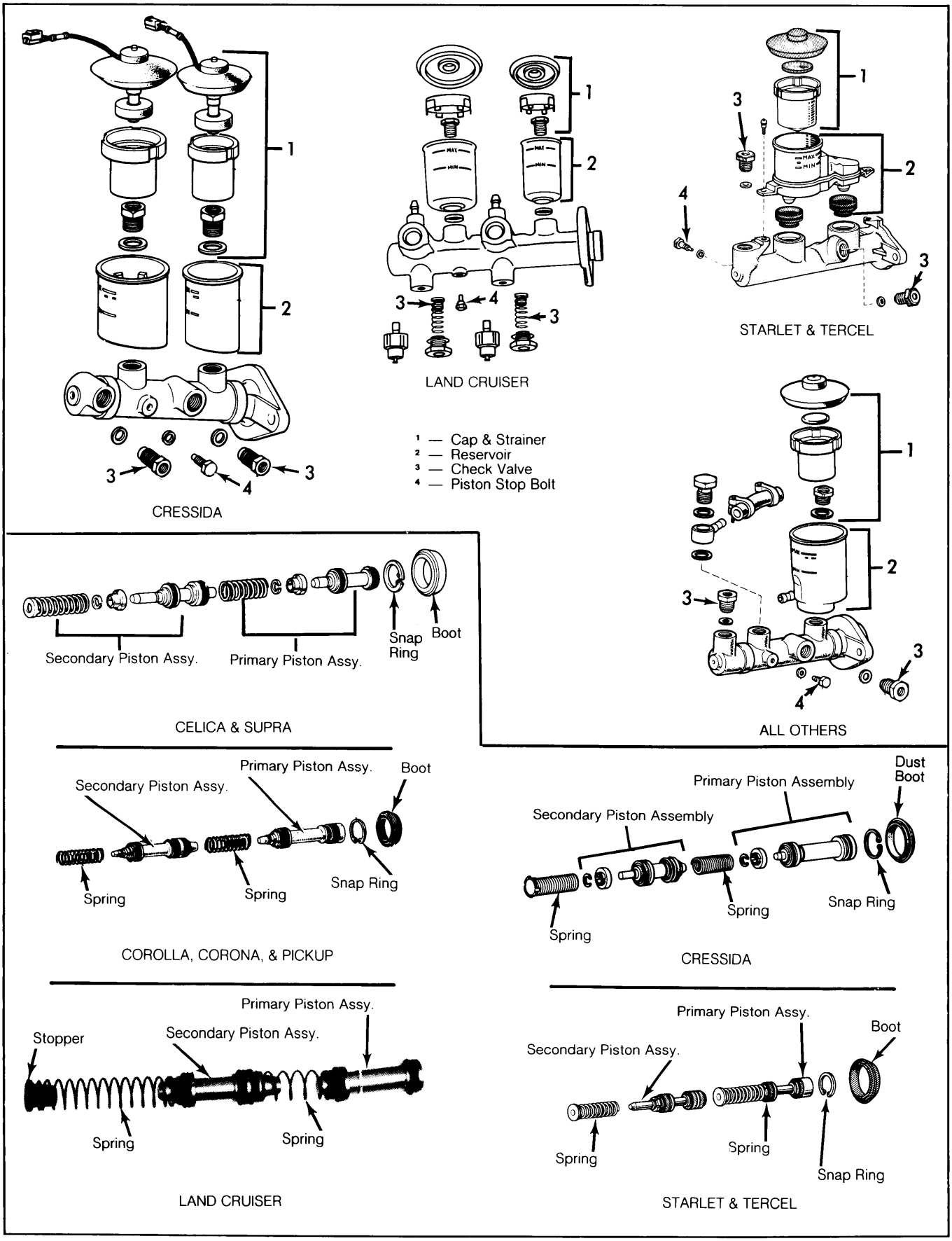
Wash all parts in clean brake fluid, and inspect for wear, damage or corrosion. Replace defective parts as required.

Reassembly

To reassemble, reverse disassembly procedure using all new rubber parts, and lubricating all components with clean brake fluid.

TOYOTA (Cont.)

Fig. 18: Exploded View of Master Cylinders With Detail of Each Model's Piston Assemblies Shown



TOYOTA (Cont.)

VACUUM PUMP

Disassembly (Cressida & Land Cruiser)

1) Drive dowel pins from end cover toward case. Separate end cover. Continue to drive dowels through case, and stop when flush with end frame.

2) Remove end frame with pins still fitted. Remove both "O" rings, and discard. Slide rotor, and blades from case.

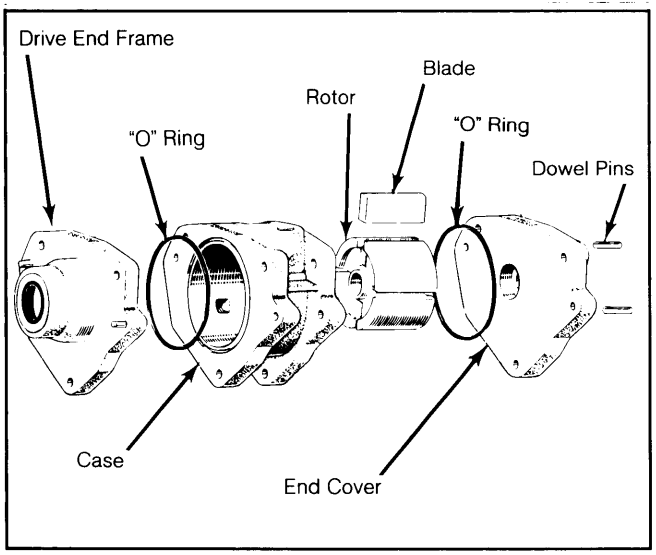
Inspection

1) Inspect end cover, and casing for damage or wear. Casing bore must not be worn beyond 2.29" (5.8 mm). Check rotor-to-valve shaft spline play.

2) Rotor wear must not exceed .095" (2.4 mm). Inspect rotor blades for the following wear limits. Height .46" (11.6 mm), length 1.374" (34.91 mm), and width .272" (6.9 mm).

3) Check end frame bushing, and oil seal. Bushing bore must not exceed .635" (16.44 mm). Replace oil seal by prying out, and pressing in new one.

Fig. 19: Exploded View of Vacuum Pump



When reassembling lightly coat new "O" rings with grease.

Reassembly

Lightly coat new "O" rings, and insert into grooves. Refit rotor, and blades. Drive in dowel pins.

POWER BRAKE UNIT

NOTE: Power brake units are produced by several manufacturers, and may vary slightly between model application. The following overhaul procedures can be used with minor attention to detail of specific booster being repaired. Refer to Figs. 20, 21, and 22.

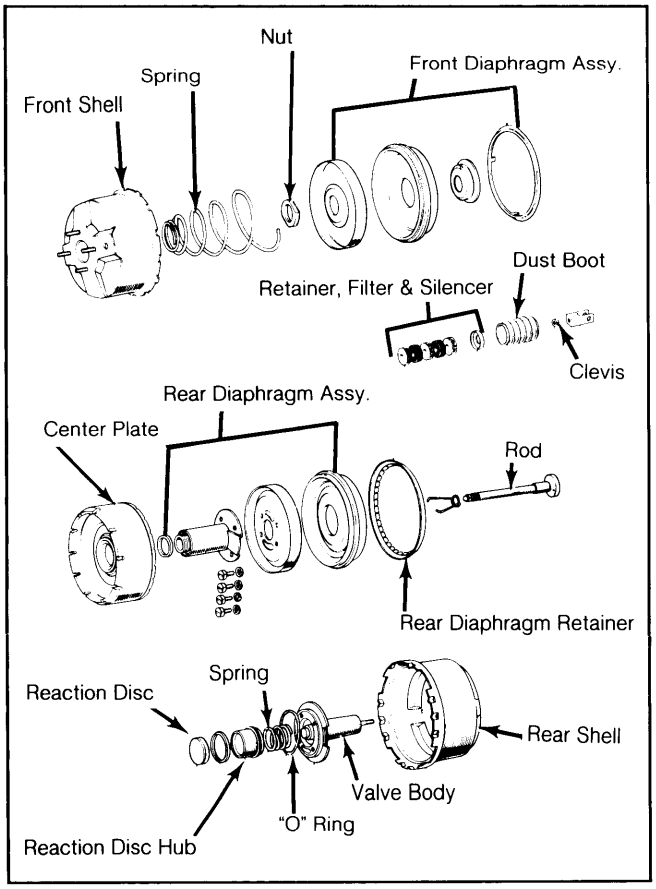
Disassembly

1) Remove check valve, and grommet from front of unit (except Corolla, Pickup, and Tercel), then remove push rod (except Land Cruiser).

2) From rear of unit, remove clevis, nut, and dust boot. Using a screwdriver, pry off retainer, and remove filter, and silencer pack.

NOTE: Check valve on Corolla, Pickup, and Tercel is located in vacuum line, and is mounted on firewall.

Fig. 20: Land Cruiser Power Brake Unit



3) Place an alignment mark on front and rear shells for reassembly reference. Mount unit in support to prevent internal spring pressure from forcing shells apart.

4) On units equipped with clamping band, remove bolt, and nut. Remove band, and separate front and rear shells. On all other units, rotate front shell counterclockwise, and separate front and rear shells.

5) On Land Cruiser, remove front diaphragm lock nut, and separate front diaphragm assembly. Remove rear diaphragm retainer, and center plate. Remove rear diaphragm lock nut, and 4 hub bolts.

6) Remove hub, and separate rear diaphragm assembly. Remove push rod, and spring, reaction disc, reaction disc hub, and spring, valve body, and "O" ring from rear shell.

7) On Aisin units, remove spring from front shell. Remove spring retainer, reaction plate and levers, and "O" ring from diaphragm plate. Remove snap ring, then pull operating rod out through rear of diaphragm plate.

8) Remove diaphragm retainer, then separate diaphragm, and diaphragm plate. Remove star washer, seal, and boot from rear shell.

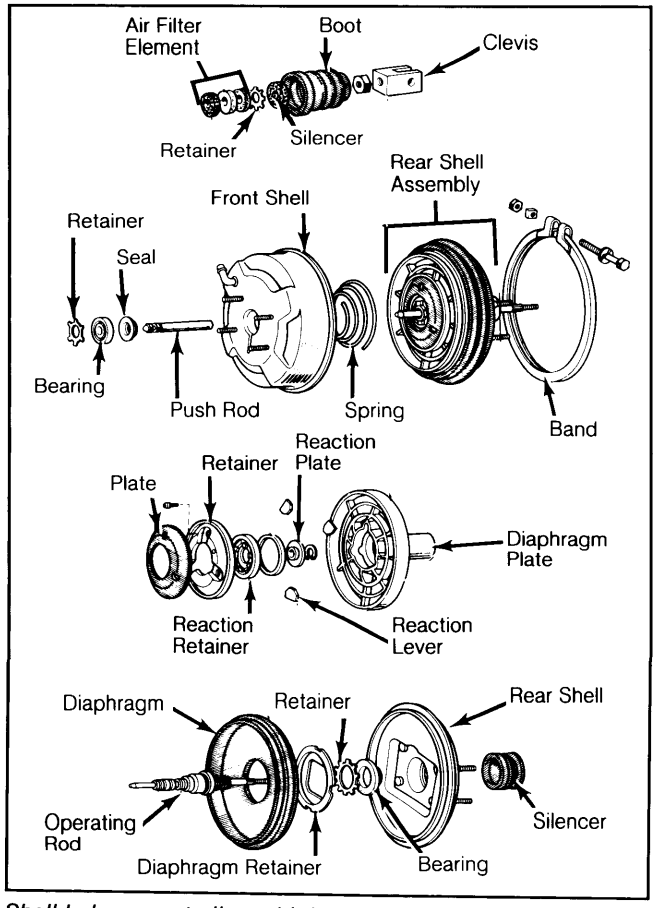
9) On JKK units, remove push rod, and spring from front shell. Remove diaphragm from diaphragm plate. *See Fig. 22.*

10) Depress operating rod, remove stopper key, then pull out operating rod, and reaction disc. Remove star washer, seal, and bearing from rear shell.

Brakes

TOYOTA (Cont.)

Fig. 21: Exploded View of Aisin Power Brake Unit

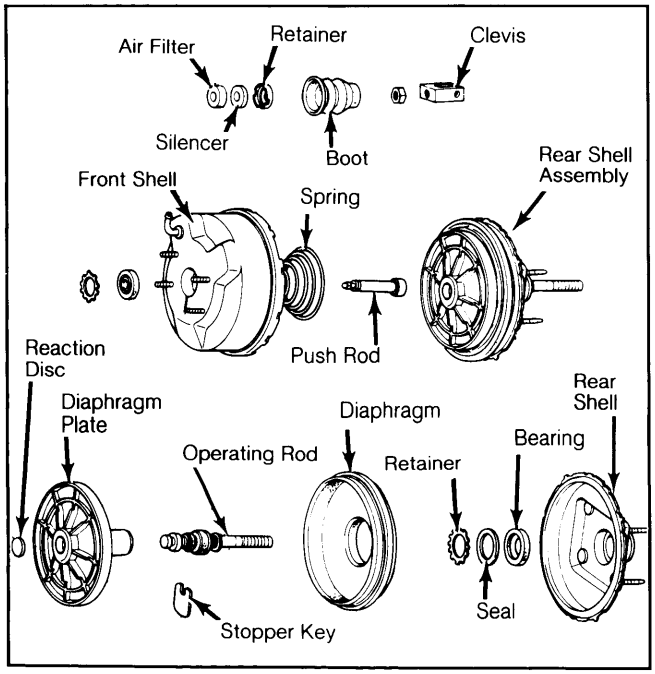


Shell halves must align with index marks.

Cleaning & Inspection

Wash all parts in denatured alcohol. Inspect all components for wear or damage, Replace defective parts. Replace all rubber parts during overhaul.

Fig. 22: Exploded View of JKK Power Brake Unit



Reassembly

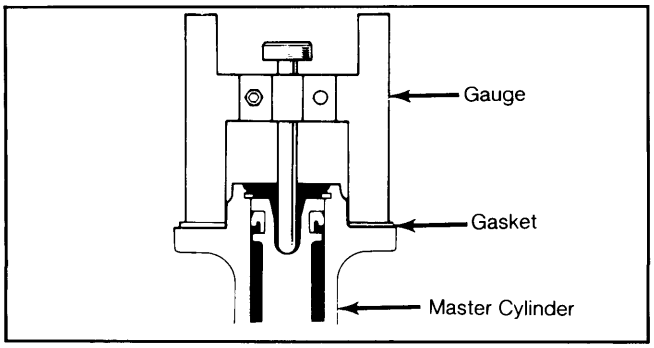
1) Apply silicone grease to front, and rear shell seals, and reaction disc. Coat diaphragm edge with light coat of oil before final tightening. Shell halves must align with index marks.

2) Reassemble power brake unit by reversing removal procedure, and note the following: On Aisin units, secure diaphragm to diaphragm plate by turning retainer 45°. On JKK units, rear seal must be seated .40-.43" (10-11 mm) from rear shell body.

3) On Land Cruiser, fit reaction disc with protrusion directed toward valve body, and install center plate on hub with large groove facing front side.

4) After installation, adjust push rod length using depth gauge (09737-00010). Place gauge on master cylinder (with gauge gasket installed if equipped), and turn pin until tip touches piston. *See Fig. 23.*

Fig. 23: Adjusting Push Rod Clearance With Gauge



5) Without disturbing gauge setting, turn gauge upside down on power brake unit. Adjust length of push rod by turning nut until clearance between gauge, and tip of push rod is obtained.

6) Under no vacuum, clearance should be .024-.026" (.60-.65 mm). When vacuum is applied, clearance should be .004-.020" (.1-.5 mm).

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Caliper Mounting Bolts	
Celica, Corolla & Supra	44-54 (60-73)
Corona, Cressida & 2-WD Pickup	68-86 (92-117)
4-WD Pickup	54-76 (73-103)
Land Cruiser	73-108 (99-147)
Caliper Bracket-to-Steering Knuckle	
Cab & Chassis Pickup	80-126 (109-171)
Tercel	33-39 (45-53)
Caliper-to-Caliper Bracket	
(Starlet & Tercel)	11-15 (15-20)
Caliper Bridge Bolts (Corolla)	58-68 (79-92)
Guide Plate-to-Caliper Bolts	
Cab & Chassis Pickup	29-44 (39-60)
Hub-to-Rotor Bolts	
Cab & Chassis Pickup	40-54 (54-73)
All Others	29-39 (39-53)
Tercel Suspension Components	
Axle Nut	73-108 (99-147)
Lower Arm-to-Crossmember	51-65 (69-88)
Lower Arm-to Steering Knuckle	40-52 (54-71)
Stabilizer Bar	11-15 (15-20)
Steering Knuckle-to-Shock	40-52 (54-71)
Strut Bar	29-39 (39-53)
Tie Rod End	37-50 (50-68)

TOYOTA (Cont.)

DISC BRAKE ROTOR SPECIFICATIONS

Application	Disc Diameter In. (mm)	Lateral Runout In. (mm)	Parallelism In. (mm)	Original Thickness In. (mm)	Min. Refinish Thickness In. (mm)	Discard Thickness In. (mm)
Cab & Chassis Pickup	.....	.006 (.15)	.....	.787 (20)	.....	.748 (19)
Other Pickups	.....	.006 (.15)	.....	.492 (12.5)	.....	.453 (11.5)
Land Cruiser	.....	.005 (.12)	.....	.787 (20)	.....	.748 (19)
Supra						
Front	.....	.006 (.15)	.....	.492 (12.5)	.....	.453 (11.5)
Rear	.....	.006 (.15)	.....	.394 (10)	.....	.354 (9)
Starlet & Tercel	.....	.006 (.15)	.....	.394 (10)	.....	.354 (9)
All Others	.....	.006 (.15)	.....	.492 (12.5)	.....	.453 (11.5)

DRUM BRAKE SPECIFICATIONS

Application	Drum Diam. In. (mm)	Drum Width In. (mm)	Max. Drum Refinish Diam. In. (mm)	Brake Cyl. Diam. In. (mm)	Master Cyl. Diam. In. (mm)
Land Cruiser	11.61 (295)	.....	11.69 (297)	.....	.....
Pickups	10.00 (254)	.....	10.079 (256)	.....	.....
Starlet & Tercel	7.87 (200)	.....	7.95 (202)	.....	.....
All Others	9.0 (228.6)	.....	9.079 (230.6)	.....	.....