

1967-73 JAGUAR – GIRLING

420 & 420G (1967)
XKE (1965-71)
XJ6 Sedan (1970-73)
XJ12 Sedan (1971-73)

DESCRIPTION

XJ6 & XJ12

Brake system utilizes four wheel disc brakes and a tandem master cylinder connected to a power servo unit. Master cylinder provides separate hydraulic circuits for front and rear brake calipers. Front calipers are mounted on stub axle carriers and rear calipers are mounted inboard on differential housing, with rotors connected to differential drive flanges. Each front caliper consists of three pistons (two outboard, one inboard), and each rear caliper consists of two opposing pistons. Parking brake consists of independent lever-operated calipers mounted on service brake calipers. Parking brake calipers operate on service brake rotors.

420 & XKE

Brake system utilizes four wheel disc brakes. Master cylinder is combined with a booster reaction valve, actuating a tandem piston slave cylinder connected to a booster servo. Each cylinder employs a separate hydraulic fluid reservoir. Master cylinder is actuated by pedal linkage and slave cylinder is operated by servo. Slave cylinder contains two separate hydraulic circuits actuating front and rear brake calipers. Front calipers, mounted on steering arms, consist of three pistons (two outboard, one inboard). Rear calipers, mounted on differential housing, consist of two opposing pistons, and operate on rotors connected to differential output flanges. Parking brake consists of two separate lever operated calipers mounted on service brake calipers. Parking brake calipers operate on service brake rotors.

ADJUSTMENT

DISC BRAKE PADS

Due to self-adjusting feature of calipers, no adjustment in service is required.

PARKING BRAKE

Parking Brake Caliper – Caliper is self-adjusting to compensate for pad wear, therefore, no adjustment is required.

Parking Brake Cable (XJ6 & XJ 12) – Fully release lever. Loosen front yoke lock nut, and remove clevis pin securing yoke to bell crank lever. Ensure calipers are fully released. Turn back yoke on adjuster rod so a slight amount of slack is present when yoke is connected to lever. **CAUTION** – Binding may result if all slack is removed from cable. Connect yoke to lever, secure with clevis pin, and tighten lock nut.

Parking Brake Cable (420 & XKE) – Fully release parking brake lever. Loosen lock nut at rear of cable. Screw out threaded adapter until parking brake operating lever starts to move. Loosen adapter one-half turn and tighten lock nut. **CAUTION** – Do not remove all slack from cable because binding may result.

HYDRAULIC SYSTEM BLEEDING

Keep hydraulic fluid reservoirs filled with clean brake fluid during bleeding operation. Attach a bleed tube to bleeder screw

on left-rear brake caliper, and immerse opposite end of tube in a container partially filled with brake fluid. **NOTE** – On XKE, remove rear seat for access to rear brake caliper bleeder screws. Loosen bleeder screw, operate pedal through full stroke until discharged fluid is free of air bubbles, and close bleeder screw. Repeat procedure on right-rear caliper and front calipers. Refill brake fluid reservoirs and check system for leaks.

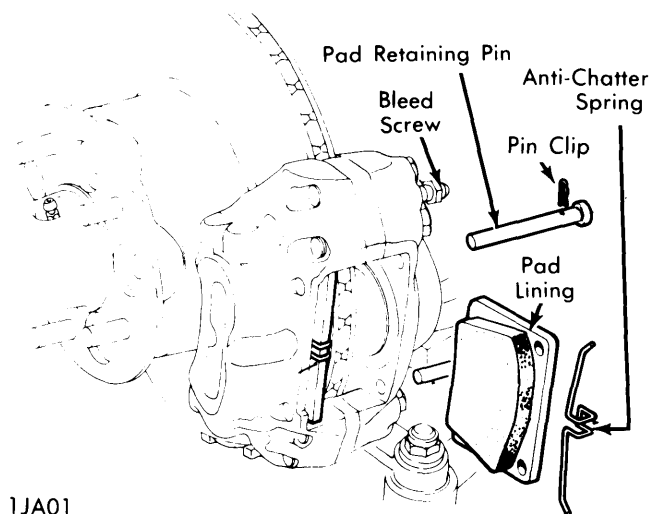
REMOVAL & INSTALLATION

DISC PADS (SERVICE BRAKES)

NOTE – Following procedure is used to remove disc pads from all four wheels on all vehicles, except rear pads on XKE.

Removal (All Exc. XKE Rear) – Raise vehicle and remove wheels. Remove pin clips, pad retaining pins, anti-chatter springs (if equipped) and lining pads.

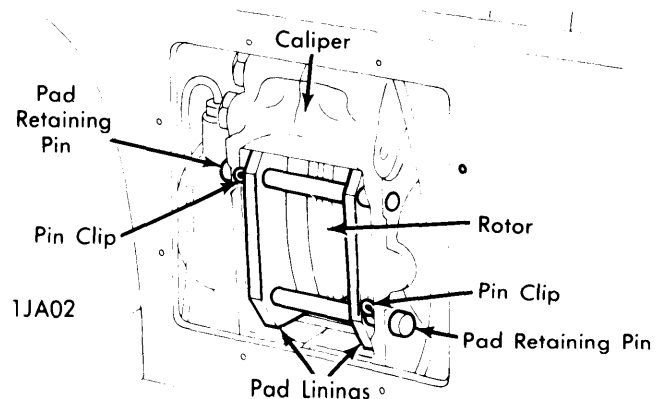
Installation – Draw out about half the brake fluid from reservoir(s). This will enable caliper pistons to be pushed back into cylinders without overflowing fluid. Lever pistons back, insert new pads, springs and replace retaining pins and clips. Check pads for freedom of movement within caliper. Check reservoirs for correct fluid level.



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FRONT CALIPER LINING REPLACEMENT

Removal (XKE Rear) – Remove rear seat cushion and both caliper inspection covers for access to rear calipers. Remove clips, retaining pins, and withdraw pads.



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XKE REAR CALIPER LINING REPLACEMENT
(REAR SEAT REMOVED)

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Installation – Draw out about half the reservoir fluid if pistons are to be pushed back within cylinders. Install new pads, pins, and clips. Clean old sealer from inspection covers and apply suitable waterproof sealer. Install new gaskets and secure bolts. Replace seat cushion and check reservoir fluid level.

DISC PADS (PARKING BRAKE)

Removal (All Exc. XKE) – Disconnect hand brake cable levers from hand brake pad carriers. Remove bolts holding carrier retraction plate. Remove hand brake pad carrier rearwards around rotor and withdraw from suspension crossmember. Remove old pads by loosening nuts on outer face of carrier and lifting out with a suitable hook tool.

Installation – Install new pads, short face up and check retaining bolts for fit in pads. Install a new retraction plate and reassemble carrier to main caliper, but do not tighten bolts. Pull and release hand brake lever until ratchet stops. With hand brake lever pulled reasonably hard, tighten carrier pivot bolts and secure locking tabs. Reconnect hand brake linkage and check adjustment.

Removal (XKE) – Remove rear suspension unit. See *Jaguar Rear Suspension Removal in SUSPENSION Section*. With suspension system removed, lift pivot bolt lock tabs, remove bolts and retraction plate. Withdraw pad carriers through top of suspension unit crossmember. Remove pad clamp bolts and pads.

Installation – Wind pad carrier out along adjuster bolt two or three turns. Use new clamp bolts, nuts and washers to secure new pads. Wind carrier along adjuster bolt to give dimension of .750" (19.05 mm) between pad faces. Place pad carriers in position on caliper. Install retraction plate with tips in pad carrier. Secure pad carrier with bolts and tab washers. Move operating lever back and forth until ratchet stops. This sets pads to correct clearance. Reinstall suspension system, connect fluid line, hand brake cable and bleed brakes.

REMOVAL & INSTALLATION

BRAKE CALIPER

NOTE – Do not separate caliper halves for repair, if a leak exist between halves, replace caliper.

Removal (Front) – Raise vehicle and remove wheels. Disconnect caliper fluid line and plug. Discard locking wire from mounting bolts, remove nuts and caliper. **NOTE** – Check position and number of shims between steering arm and caliper, if equipped with shims replace in same order.

Installation – Place caliper in position, install shims if equipped, secure bolts and lock with wire. Connect fluid line and bleed brakes.

Removal (Rear) – Remove rear suspension unit. See *Jaguar Rear Suspension Removal in SUSPENSION Section*. With rear suspension removed, remove hand brake carrier as previously outlined. Remove brake fluid line from caliper and plug end. Remove pads, caliper retaining bolts and caliper through front opening in crossmember.

Installation – Place caliper in position, install shims if equipped, and secure bolts. Torque bolts to 49-55 ft. lbs. Check rotor for center between caliper. If necessary, adjust shims between drive flange and rotor. If shim adjustment is performed, rear wheel camber must be checked. See *Jaguar Rear Wheel Camber Adjustment in WHEEL ALIGNMENT Section*. Complete installation by reversing removal procedures.

BRAKE ROTOR

Removal (Front) – Remove caliper as previously outlined. Remove hub grease cap and cotter pin. Cotter pin is removed through hole provided in hub on vehicles with wire wheels. Remove slotted nut, washer and hub with rotor attached. Remove set screws (pressed wheels) or bolts (knock off wheels) separating rotor from hub. **NOTE** – Discard self-locking nuts used with "Knock Off Wheels", install new hub to rotor lock nuts.

Installation – Mount rotor to hub, pack bearings with suitable grease and install hub fasteners. Set hub end play within specification and check rotor runout. Install caliper and bleed brakes.

Removal (Rear) – Rear suspension system must be removed in order to remove calipers and rotors. See *Jaguar Rear Suspension Removal in SUSPENSION Section*. With suspension system removed, remove brake caliper as previously outlined. Invert suspension unit and remove shock absorber and spring assembly. Release clips from universal joint shield (if equipped) and slide back. Remove fasteners securing half shaft inner universal joint and brake rotor to differential shaft flange. Withdraw half shaft from bolts. **NOTE** – Check number and position of camber shims between universal joint and rotor. Tap brake rotor securing bolts back as far as possible. Lift lower control arm, hub carrier and half shaft assembly upward until brake rotor can be withdrawn.

Installation – Position rotor against differential shaft flange and tap through bolts. Reinstall same camber shims removed during disassembly on flange bolts. Secure half shaft universal joint flange to differential flange using four new self-locking nuts. Check brake rotor runout, limit is .006" (.15 mm). Reinstall universal joint shield, springs, shock absorber, and caliper. Use feeler gauges to check rotor for center between caliper halves. If necessary to recenter rotor, remove caliper, rotor and place required shims between drive flange and rotor. Reinstall rear suspension system, check rear wheel camber and adjust if necessary.

MASTER CYLINDER

Removal & Installation (XJ6 & XJ12) – Drain brake fluid reservoir, disconnect hydraulic lines and mark location for reassembly reference. Remove nuts and washers retaining cylinder to servo unit, remove vacuum line retaining strap, and separate cylinder from servo. To install, reverse removal procedure and bleed hydraulic system.

Removal (XKE) – Disconnect battery and remove left hand air cleaner. With Man. Trans., remove nut securing brake master cylinder and clutch reservoir. With Auto. Trans., remove fastener retaining reservoir. Drain fluid from master cylinder

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reservoir, disconnect line fitting from master cylinder and temporarily reinstall bolt to retain valve trap assembly in outlet port. Remove window washer reservoir. Loosen connector nearest to servo vacuum shell and remove fluid line clear of brake master cylinder. Loosen line clips securing air lines to reaction valve and remove lines. Remove nuts securing master cylinder to pedal box studs. Withdraw master cylinder from studs leaving push rod attached to pedal.

Removal & Installation (Model 420) – Drain master cylinder reservoir fluid, disconnect two vacuum hoses from reaction valve and two fluid lines from master cylinder. Remove brake pedal clevis and push rod. Remove fasteners with master cylinder from pedal housing. To install, reverse removal procedure, use new copper washer on fittings and bleed brakes.

Installation – Reverse removal procedure and note following: Install new copper gaskets on fluid line fittings. Check brake pedal for free travel, .125" (3.17 mm), before resistance of master cylinder piston is felt. Adjust with lock nut on push rod. Check brake light switch for proper operation.

SERVO ASSEMBLY

Removal & Installation (XJ6 & XJ12) – Remove right air cleaner and disconnect choke cable from right-front carburetor. Disconnect hydraulic lines and vacuum line. Disconnect electrical leads from fluid level warning switch. Remove reservoir and bracket assembly from pedal box. Remove nuts securing pedal box vertical mounting to firewall, lift heater vacuum pipe clear of studs, remove brake light switch, and remove bolts securing pedal box base mounting to firewall. Lift out pedal box, servo unit, and master cylinder as an assembly. Remove nuts securing servo to pedal box, remove rubber sealing plugs and remove clevis pin connecting servo operating rod to brake pedal lever. To install, reverse removal procedure and bleed hydraulic system.

Removal & Installation (XKE) – Disconnect battery, remove reservac tank, window washer reservoir and bracket. Remove slave cylinder reservoir and left hand air cleaner.

Remove fluid line from master cylinder outlet and replace bolt. Remove fuel line clip and pull off flex hose. Disconnect vacuum hoses from servo. Remove nuts securing brake master cylinder to pedal box. Withdraw master cylinder from mounting and tie to one side. Disconnect fluid lines on slave cylinder and plug ends. Remove fluid feed hose from top of slave cylinder. Inside vehicle, pull carpet from left hand front floor panel. Remove floor insulation material and floor panel cover. Remove fasteners from slave cylinder bracket and remove servo. To install, reverse removal procedure and bleed brake system.

Removal & Installation (Model 420) – Drain slave cylinder reservoir, jack up vehicle front and remove left wheel. Remove fiberglass cover to servo unit and mounting bracket. Disconnect three hoses and line fittings from servo and slave cylinder. Seal open ends of hoses and lines to prevent entry of dirt. Remove four set-screws securing servo mounting bracket to inner panel and withdraw assembly. Separate servo from mounting bracket for unit service. To install, reverse removal procedure.

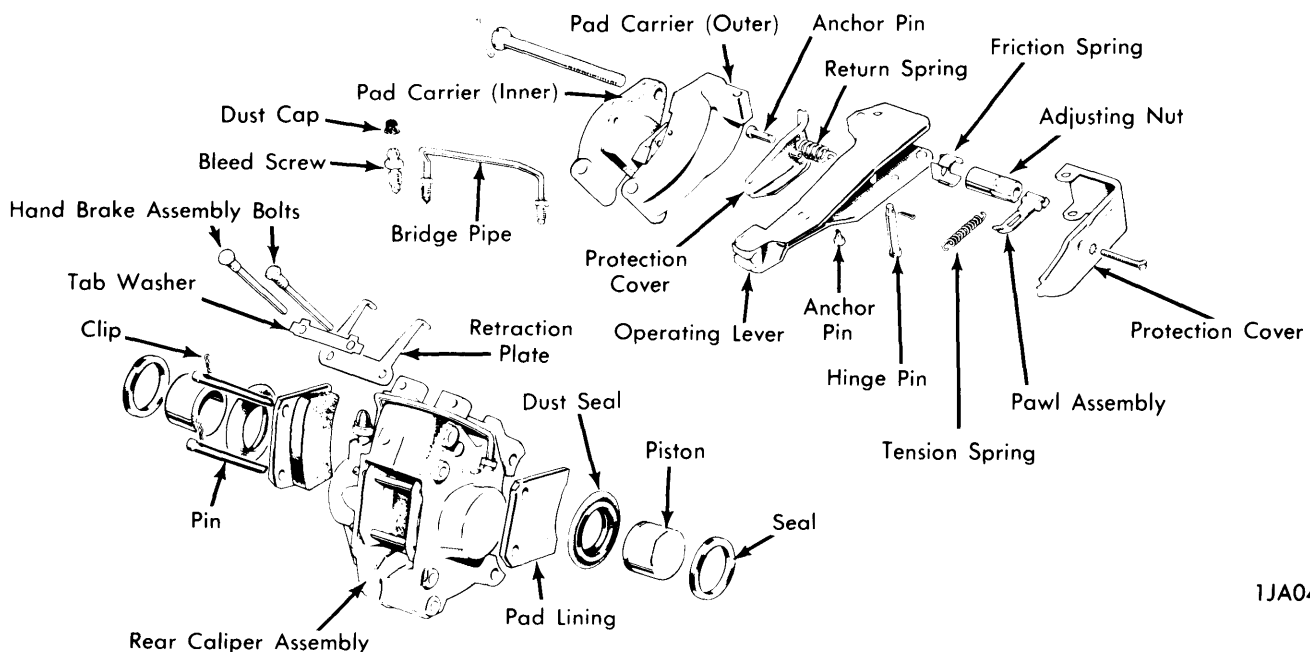
OVERHAUL**BRAKE CALIPER**

NOTE – DO NOT separate caliper halves for service; pistons and seals may be changed without splitting caliper. If a leak is detected between caliper halves, replace caliper as a unit.

Disassembly (All Models) – With disc pads removed, install a piston clamp to retain outboard piston(s), then apply compressed air to fluid inlet and remove inboard piston. Pull dust seal from piston and caliper grooves. Carefully remove piston seal from cylinder. Remove outboard piston(s) and seals in same manner.

Cleaning & Inspection – Clean all parts in alcohol and inspect for wear or damage. Check cylinder bore and pistons for scratches, rust or corrosion; replace all damaged parts.

Reassembly – Coat cylinder, piston and seal with brake fluid before installing. Place piston seal in bore. Install dust seal

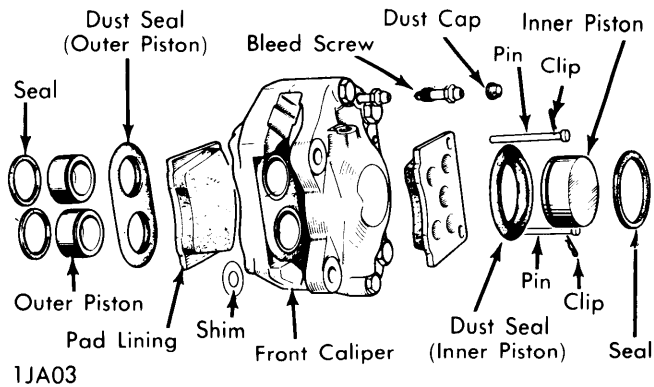


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REAR CALIPER & PARKING BRAKE ASSEMBLY

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over cylinder groove and carefully insert piston through dust seal. Pull dust seal into groove in piston. Use piston clamp to press piston completely into cylinder. Repeat procedure for outer piston seal replacement. Install caliper as previously outlined.



FRONT CALIPER COMPONENTS

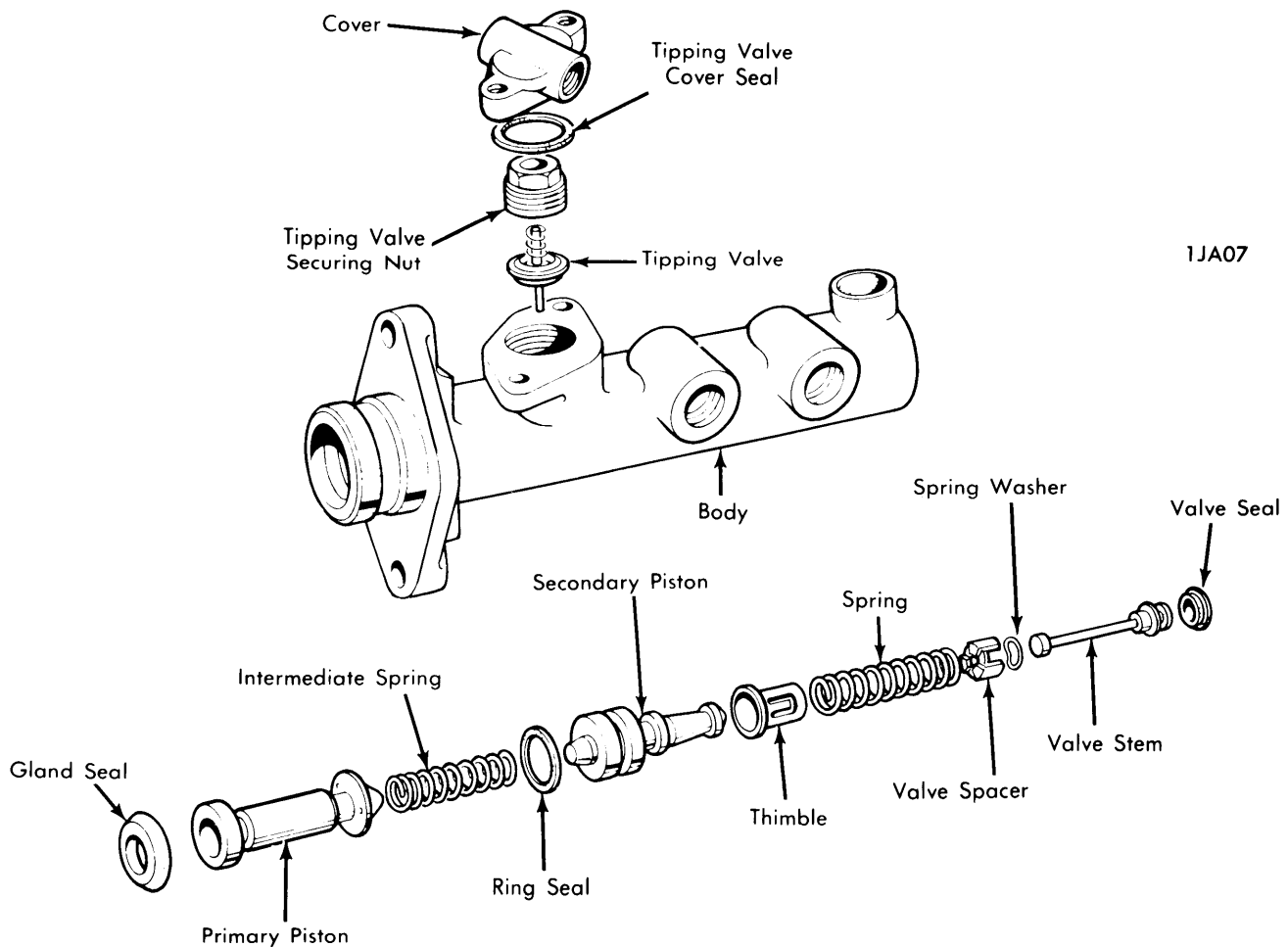
MASTER CYLINDER

Disassembly (XJ6 & XJ12) – Remove tipping valve cover, seal, and retaining nut. Depress primary piston and remove tipping valve. Withdraw primary piston, spring, and secondary piston assembly. Compress secondary piston spring and lift spring retainer leaf. Remove valve, waved washer, spacer, spring and thimble. Remove seals from valve head, and primary and secondary pistons.

Cleaning & Inspection – Clean all parts in alcohol and dry with a lint-free cloth. Inspect pistons and bore for wear, scores, or corrosion; replace damaged parts as necessary.

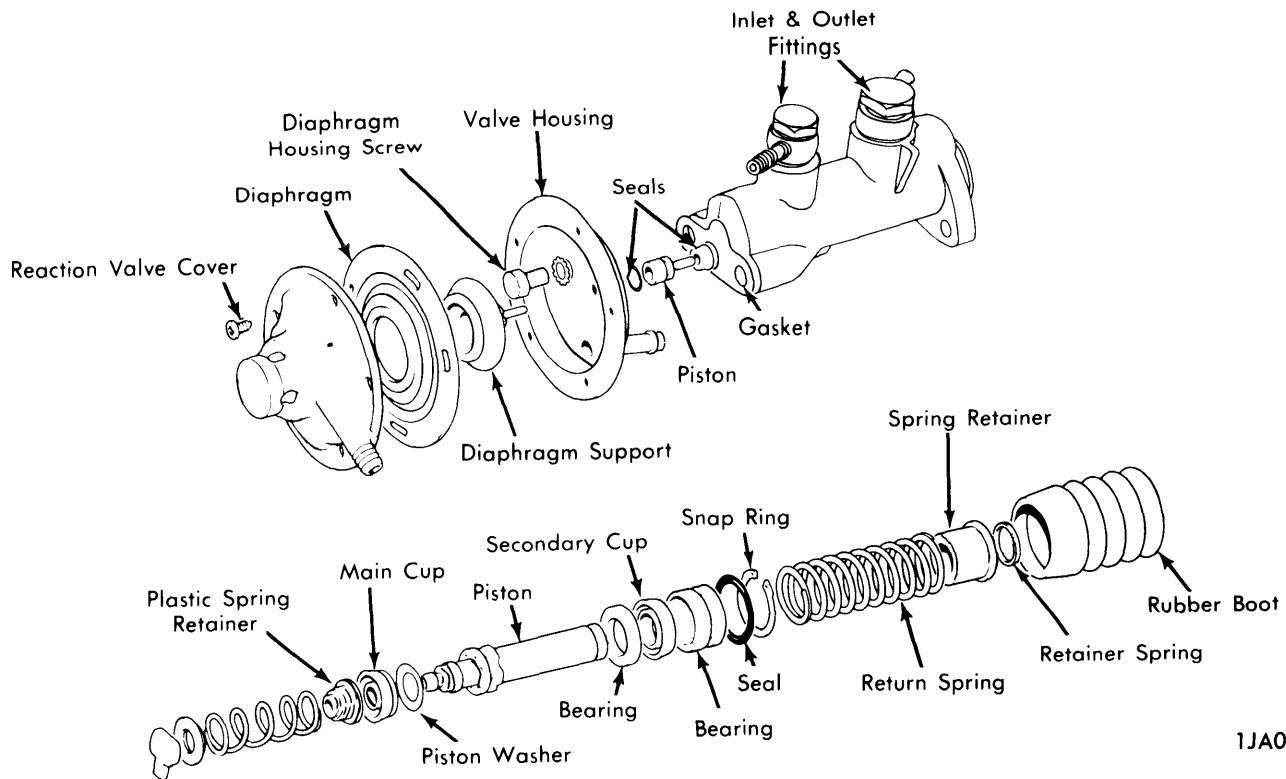
Reassembly – Lubricate all parts with clean brake fluid, reverse disassembly procedure, and note the following: Install seal on primary piston with groove facing forward. Install valve seal with smallest diameter leading onto valve head.

Disassembly (XKE – 1) Remove bolts, fittings, and valve trap assembly from top of cylinder. Remove dust boot, compress piston return spring and remove spring retainer. Press piston into bore, remove snap ring using special snap ring pliers (7066), and remove piston assembly, spring, spring



MASTER CYLINDER ASSEMBLY (XJ6 & XJ12)

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MASTER CYLINDER & REACTION VALVE (XKE)

retainer and lever. **NOTE** – Bearing "O" ring seal may expand into snap ring groove making removal difficult. If necessary, wrap jaws of pliers with tape and use to extract piston assembly.

2) Remove bearing, "O" ring seal, and secondary cup assembly from piston. Remove plastic spring retainer. **NOTE** – Retainer is a press fit on piston and requires firm force against its back to remove. Remove main cup and piston washer. Remove reaction valve assembly from cylinder body. Remove valve piston by inserting a screwdriver into fluid line outlet port. Move valve along its bore until it can be removed by hand. Remove "O" ring and seal from piston.

Cleaning & Inspection – Wash all components in alcohol and inspect for scoring, pitting, or wear. Replace all damaged parts. Before assembly, coat "O" ring seals and plastic bearings with disc brake lubricant.

Reassembly – Coat all parts with clean brake fluid, reverse disassembly procedure, and note the following: When installing piston lever, make sure lever tab drops into recess when lever reaches bottom of cylinder bore. If necessary, press reaction valve piston forward with a blunt screwdriver fed through fluid outlet port.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (mkg)
Caliper Mounting Bolts	57 (7.8)
Front	57 (7.8)
Rear	52 (7.1)
Rotor-to-Front Hub	33 (4.6)
Pedal Box-to-Body	16 (2.2)
Wheel Nuts	
XJ6 & XJ12	50 (6.9)
XKE & 420	55 (7.6)

BRAKE SPECIFICATIONS

Application	In. (mm)
Rotor Thickness	
Front	
XJ6 & 420500 (12.7)
XJ12 & XKE950 (24.1)
Rear (All)500 (12.7)
Rotor Diameter	
Front (All)	11.18 (284.0)
Rear (All)	10.37 (263.5)
Rotor Runout (Max.)006 (.152)
Master Cylinder Bore Dia. (All)857 (21.8)