ISUZU

I-Mark

DESCRIPTION

Brake system is hydraulically operated using a tandem master cylinder and a vacuum operated power brake unit. All models are equipped with front disc and rear drum brakes. Rear brakes are of the leading/trailing type and have a self adjusting mechanisim. A combination valve is installed in engine compartment and includes a pressure limiting valve and a differential pressure switch (fail indicator). Parking brakes are cable operated and operate on rear wheels.

ADJUSTMENT

REAR DRUM BRAKE

Raise and support vehicle. Index mark wheel assembly and axle flange and remove wheel and tire. Remove brake drum. Measure inside diameter of brake drum with brake measuring tool (J-21177 or equivalent). Adjust brake shoes to brake drum dimension. Use a screwdriver to move auto adjuster lever to adjust. Install brake drum and wheel assembly. Lower vehicle.

PARKING BRAKE

Fully release parking brake lever. Check cable for free movement. Remove cable play by turning brake lever rod adjustment nut. Parking brake lever travel should be 8-10 notches.

PEDAL HEIGHT AND FREE PLAY

Adjust pedal free play by turning the push rod. Distance between upper face of brake pedal and carpet should be 6.73" (171 mm). Push the brake pedal by turning the stop light switch so that free play is eliminated. Tighten clevis lock nut and stop light switch lock nut.

REMOVAL & INSTALLATION

FRONT DISC PADS

Removal & Installation — Raise and support front of vehicle. Remove wheel and tire. Remove clips, pins, retaining spring, pad shims and brake pads. To install, apply P.B.C (Poly Butyl Caprysil) grease to face of pads and pad shims as shown in *Fig. 1*. Push pistons back into bores after slightly opening bleeder valves. Close valves. Assemble pad shims to brake pads with arrow pointing in direction of normal disc rotation. Install assembly to caliper. Install retaining spring, pins and clips. Install wheels and lower vehicle.

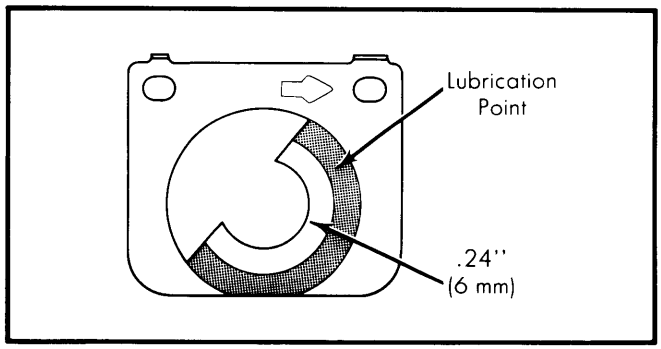

Fig. 1 Pad Shim Lubrication Point

FRONT DISC CALIPER

Removal & Installation — Raise and support vehicle. Remove wheel and tire. Disconnect caliper hose from caliper and plug to prevent enty of dirt. Remove caliper mounting bolts and caliper. To install, reverse removal procedure.

FRONT DISC ROTOR

Removal & Installation — Raise and support vehicle. Remove tire and wheel. Remove caliper and suspend out of way. DO NOT allow to hang from hydraulic hose. Remove grease cap cotter key and spindle nut. Remove hub and disc assembly. Remove hub-to-rotor bolts and remove rotor from hub. To install, reverse removal procedure. Adjust wheel bearings. *See Wheel Bearing Adjustment in SUSPENSION Section.*

REAR BRAKE SHOES

Removal — Raise and support vehicle. Remove tire and wheel. Remove brake drum. Remove return springs and hold down pins, cups and springs. Move the automatic adjuster lever all the way in direction of expansion and disconnect the strut. Remove the primary shoe. Disconnect parking brake cable from parking brake lever and remove secondary shoe.

Installation — Install the secondary shoe, and install the parking brake cable to the parking brake lever. Install the primary shoe, strut and automatic adjuster lever. Install return springs, and shoe hold down springs, cups and pins. Install drum and adjust brake linings as outlined previously. Install wheel and lower vehicle.

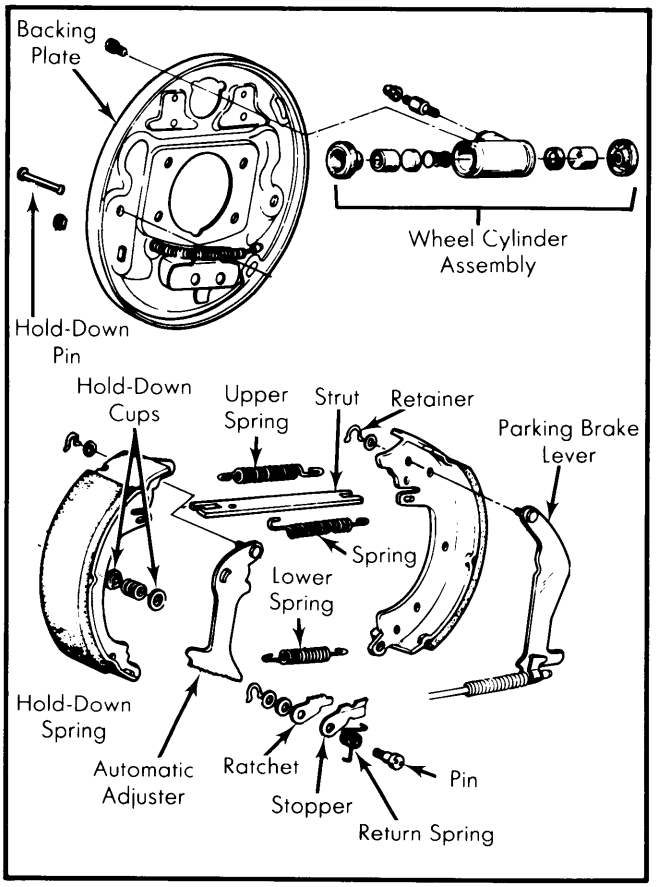

Fig. 2 Exploded View of Rear Brake Assembly

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MASTER CYLINDER

Removal — Disconnect hydraulic lines from master cylinder. Remove nuts securing master cylinder to power brake unit and support bracket. Remove bolts securing fluid reservoir bracket and remove master cylinder assembly and fluid reservoir.

Installation — Place master cylinder and reservoir in position with the fluid reservoir bracket and install bolts securing bracket to inner fender. Install nuts holding master cylinder to power brake unit and support bracket. Connect front and rear hydraulic lines to master cylinder. Bleed hydraulic system.

POWER BRAKE UNIT

Removal — Disconnect hydraulic lines from master cylinder. Cover and plug line ends. Remove master cylinder bracket bolts to cylinder and fender skirt and remove bracket. Remove vacuum hose clip and hose from check valve. Remove clevis pin and separate clevis from brake pedal arm. Remove power brake unit to dash panel retaining nuts and lift out power brake unit and master cylinder.

Installation — Install the master cylinder and power brake unit to the dash panel and support bracket. Connect hydraulic lines to master cylinder. Tighten master cylinder to power brake unit nuts, power brake to dash panel nuts and master cylinder support bracket bolt. Adjust brake pedal height and bleed brake system.

OVERHAUL

FRONT CALIPER

Disassembly — With caliper and pads removed, remove dust seal ring and dust seal from each piston. Install clamp (J-22429) on mounting half of caliper. Remove rim half piston by applying compressed air to brake line connection. Install clamp on rim half of caliper. Remove mounting half piston with compressed air. Remove piston seals from annular grooves in caliper piston bores.

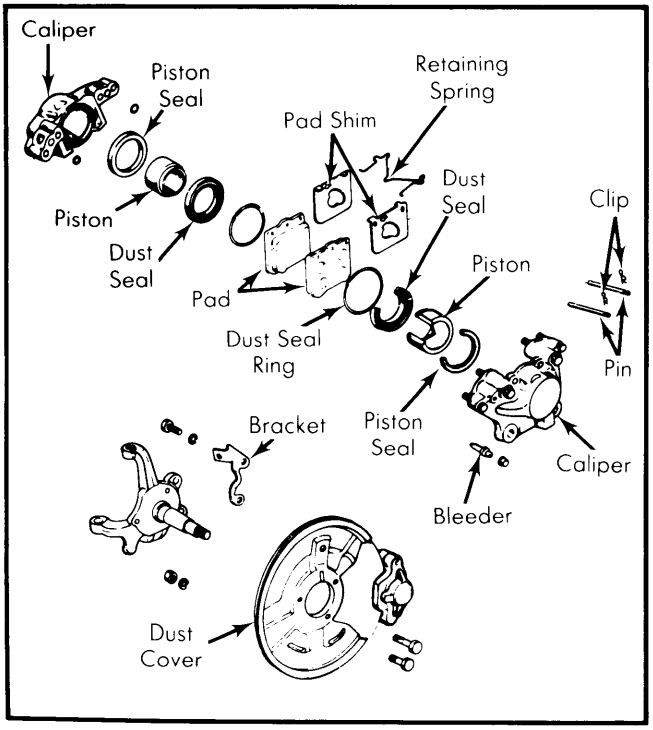

Fig. 3 Exploded View of Disc Brake Assembly

Reassembly — Apply rubber grease to seal and cylinder wall and install new piston seal in cylinder. Carefully install piston to bottom of cylinder bore using finger pressure only. Install dust seal and seal ring. Assemble pad shim to brake pad with arrow pointing in direction of normal disc rotation and install in caliper. Install retaining spring pins and clips.

MASTER CYLINDER

Disassembly — Pour brake fluid out of reservoir. Disconnect the front and rear rubber hoses from the master cylinder and separate the fluid reservoir. Place the cylinder in a vise and remove pipe connector. Remove check valve, spring and retainer. Push in on primary piston with a screwdriver and remove secondary piston stop bolt and snap ring. Remove primary piston assembly, primary piston spring, secondary piston assembly and secondary piston spring.

Inspection — Measure master cylinder bore diameter and outside diameter of primary and secondary pistons. Standard bore diamenter is .875" (22.2 mm). Clearance limit is .006" (.15 mm). Replace cylinder if damage is found or if clearance is beyond limit.

Reassembly — 1) Lubricate parts with clean brake fluid. Assemble the spring check valve, gasket and pipe connector to the cylinder body and semi-tighten the pipe connector. Clamp cylinder in soft-jawed vise and tighten pipe connector. Install the primary piston spring and primary piston assembly into cylinder and set in position with snap ring.

2) Carefully note the direction of setting when assembling primary and secondary piston assembly into cylinder. Do not force piston into cylinder. Press primary piston all the way into position with a screwdriver and install secondary piston stop bolt with a gasket on the cylinder body.

WHEEL CYLINDER

Disassembly — Remove boots, pistons, piston cups, spring and bleeder screw from the wheel cylinder.

Inspection — Measure wheel cylinder bore and outside diameter of piston. Limit of clearance is .006" (.15 mm). Standard cylinder bore diameter is .812" (20.6 mm).

Reassembly — Lubricate the sliding parts of wheel cylinder with clean brake fluid. Assemble into cylinder so that piston cups are facing outward. Apply rubber grease to inner face of boots before installing boots.

POWER UNIT

Disassembly — 1) With master cylinder and power unit removed from vehicle, pour brake fluid out of reservoir. Disconnect the front and rear rubber hoses from the master cylinder and separate the fluid reservoir. Clamp the flange of the master cylinder assembly in a vise with the power unit up. Index mark shell mating surfaces for reassembly reference.

2) Remove 4 nuts and spacer from rear shell of power unit. Loosen and remove lock nut and clevis from operating rod. Attach booster housing tool (J-9504-01) to rear shell and

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MASTER CYLINDER

Removal — Disconnect hydraulic lines from master cylinder. Remove nuts securing master cylinder to power brake unit and support bracket. Remove bolts securing fluid reservoir bracket and remove master cylinder assembly and fluid reservoir.

Installation — Place master cylinder and reservoir in position with the fluid reservoir bracket and install bolts securing bracket to inner fender. Install nuts holding master cylinder to power brake unit and support bracket. Connect front and rear hydraulic lines to master cylinder. Bleed hydraulic system.

POWER BRAKE UNIT

Removal — Disconnect hydraulic lines from master cylinder. Cover and plug line ends. Remove master cylinder bracket bolts to cylinder and fender skirt and remove bracket. Remove vacuum hose clip and hose from check valve. Remove clevis pin and separate clevis from brake pedal arm. Remove power brake unit to dash panel retaining nuts and lift out power brake unit and master cylinder.

Installation — Install the master cylinder and power brake unit to the dash panel and support bracket. Connect hydraulic lines to master cylinder. Tighten master cylinder to power brake unit nuts, power brake to dash panel nuts and master cylinder support bracket bolt. Adjust brake pedal height and bleed brake system.

OVERHAUL

FRONT CALIPER

Disassembly — With caliper and pads removed, remove dust seal ring and dust seal from each piston. Install clamp (J-22429) on mounting half of caliper. Remove rim half piston by applying compressed air to brake line connection. Install clamp on rim half of caliper. Remove mounting half piston with compressed air. Remove piston seals from annular grooves in caliper piston bores.

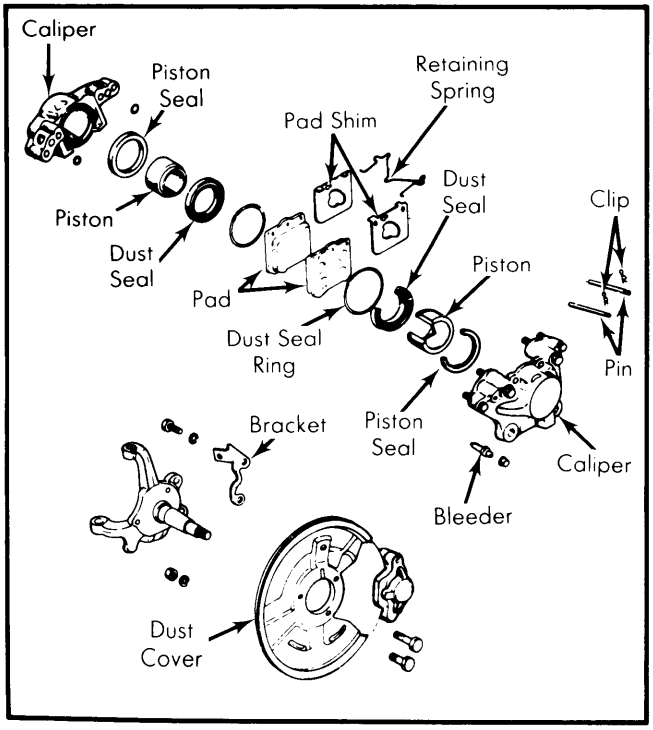

Fig. 3 Exploded View of Disc Brake Assembly

Reassembly — Apply rubber grease to seal and cylinder wall and install new piston seal in cylinder. Carefully install piston to bottom of cylinder bore using finger pressure only. Install dust seal and seal ring. Assemble pad shim to brake pad with arrow pointing in direction of normal disc rotation and install in caliper. Install retaining spring pins and clips.

MASTER CYLINDER

Disassembly — Pour brake fluid out of reservoir. Disconnect the front and rear rubber hoses from the master cylinder and separate the fluid reservoir. Place the cylinder in a vise and remove pipe connector. Remove check valve, spring and retainer. Push in on primary piston with a screwdriver and remove secondary piston stop bolt and snap ring. Remove primary piston assembly, primary piston spring, secondary piston assembly and secondary piston spring.

Inspection — Measure master cylinder bore diameter and outside diameter of primary and secondary pistons. Standard bore diamenter is .875" (22.2 mm). Clearance limit is .006" (.15 mm). Replace cylinder if damage is found or if clearance is beyond limit.

Reassembly — **1)** Lubricate parts with clean brake fluid. Assemble the spring check valve, gasket and pipe connector to the cylinder body and semi-tighten the pipe connector. Clamp cylinder in soft-jawed vise and tighten pipe connector. Install the primary piston spring and primary piston assembly into cylinder and set in position with snap ring.

2) Carefully note the direction of setting when assembling primary and secondary piston assembly into cylinder. Do not force piston into cylinder. Press primary piston all the way into position with a screwdriver and install secondary piston stop bolt with a gasket on the cylinder body.

WHEEL CYLINDER

Disassembly — Remove boots, pistons, piston cups, spring and bleeder screw from the wheel cylinder.

Inspection — Measure wheel cylinder bore and outside diameter of piston. Limit of clearance is .006" (.15 mm). Standard cylinder bore diameter is .812" (20.6 mm).

Reassembly — Lubricate the sliding parts of wheel cylinder with clean brake fluid. Assemble into cylinder so that piston cups are facing outward. Apply rubber grease to inner face of boots before installing boots.

POWER UNIT

Disassembly — **1)** With master cylinder and power unit removed from vehicle, pour brake fluid out of reservoir. Disconnect the front and rear rubber hoses from the master cylinder and separate the fluid reservoir. Clamp the flange of the master cylinder assembly in a vise with the power unit up. Index mark shell mating surfaces for reassembly reference.

2) Remove 4 nuts and spacer from rear shell of power unit. Loosen and remove lock nut and clevis from operating rod. Attach booster housing tool (J-9504-01) to rear shell and

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carefully turn rear shell counterclockwise. Be careful as shell is under spring pressure. Maintain pressure on rear shell during removal.

3) Remove rear shell and diaphragm return spring. Remove boot from rear shell and remove diaphragm plate assembly. Remove retainer from rear shell and remove plate and seal. Remove diaphragm and silencer retainer from diaphragm assembly and remove valve plunger stopper key. Remove plunger assembly and reaction disc. Remove push rod, retainer and seal from front shell assembly.

Inspection — Clean and dry disassembled parts. Check diaphragm, boot and reaction disc from weakening, distortion or damage and replace as necessary. Check plunger assembly for wear. Replace if worn. Check diaphragm plate, check valve and vacuum hose for damage or wear and replace as necessary.

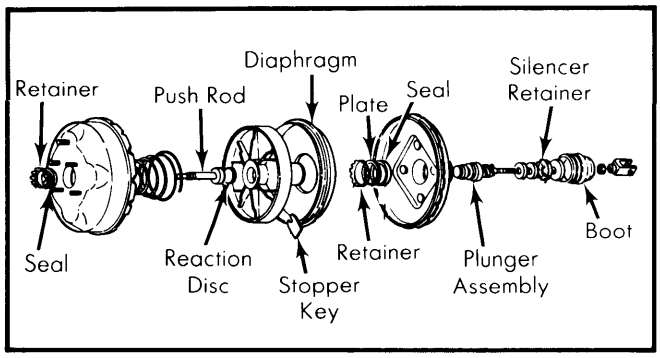

Fig. 4 Exploded View of Power Brake Unit

Reassembly — 1) Apply silicon grease to the sliding faces of parts. Apply silicon grease to the seal fitting face of the rear shell and lipped portion and install plate, seal and retainer. Apply thin coat of silicon grease to the outer and inner faces of the diaphragm plate and the outer face of the poppet valve.

2) Install plunger assembly (with filter and silencer) making sure poppet valve is not projecting beyond the retainer. Push in on plunger and install valve plunger stopper key. Apply silicon grease to reaction disc and install in diaphragm plate.

3) Assemble diaphragm assembly to rear shell and install the boot and clevis. Install seal assembly to front shell. Apply silicon grease to sliding face of seal and push rod and install retainer and push rod. Temporarily secure master cylinder to front shell with nuts and lock washers. Clamp flanged portion of master cylinder in vise (front shell side up).

NOTE — *Do not tighten vise too tightly as damage to flange will result.*

4) Apply a thin coat of silicon grease to outer rim and contact faces of front and rear shells of diaphragm. Install diaphragm spring between front and rear shells. Using booster housing tool (J-9504-01) push in and rotate rear shell clockwise until it is fully seated with scribe marks aligned. Assemble push rod boot to rear shell. Make sure boot is fully installed in retainer and install spacer to rear shell.

CAUTION — *Before releasing tool, make sure rear shell is locked to front shell at all tabs.*

5) Loosely install push rod clevis lock nut and clevis. Remove assembly from vise and separate master cylinder from power brake unit. Position power brake unit in vise so that push rod is up. DO NOT clamp tightly. Measure distance between master cylinder mounting face of front shell and end of push rod. If necessary, adjust push rod to .733" (18.6 mm). Hold rod at serrated portion and turn threaded end.

TIGHTENING SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Hydraulic Line Flare Nuts	12 (16)
Caliper-to-Steering Knuckle	36 (49)
Rotor-to-Hub	36 (49)
Master Cylinder-to-Power Brake Unit	10 (14)

DISC BRAKE SPECIFICATIONS

Application	Caliper Bore Diameter In. (mm)	Lateral Runout In. (mm)	Parallelism In. (mm)	Original Thickness In. (mm)	Minimum Refinish Thickness In. (mm)	Discard Thickness In. (mm)
I-Mark	.812 (20.6)	.006 (.15)	.....	.394 (10.0)	.338 (8.6)	.....

DRUM BRAKE SPECIFICATIONS

Application	Wheel Cyl. Bore Diameter In. (mm)	Drum Diameter In. (mm)	Original Diameter In. (mm)	Maximum Refinish Diameter In. (mm)	Discard Diameter In. (mm)
I-Mark	.812 (20.6)	9.00 (228.6)	9.00 (228.6)	9.04 (229.6)	9.055 (230.0)