

SECTION 2B — PBR TANDEM BRAKE MASTER CYLINDER

SPECIFICATIONS

Brake Master Cylinder Assembly	PBR Tandem circuit
Type	Dual reservoir, compensating type, without residual pressure valves.
Bore	25,40 to 25,48 mm (1.000 to 1.003")
Stroke — total	29,26 mm (1.152")
— split-front brakes	65%
— rear brakes	35%
Displacement — Primary (front brakes)	8.8 ml (0.54 in. ³)
— Secondary (rear brakes)	4.8 ml (0.29 in. ³)
Recommended Brake Fluid	Chrysler Heavy Duty Brake Fluid.

SPECIAL TOOLS

E5C10A	Bleeder Tubes — Master cylinder
E5C15	Tool — Tube Cutting
E5C15B	Tool — Tube Flaring

TORQUE SPECIFICATIONS

	Nm	lb. ft.	lb. in.
Secondary piston stop bolt to master cylinder	7		60
Plastic reservoir to master cylinder	3		25
Pressure differential switch end plug to master cylinder	45	33	
Pressure differential switch side plug to master cylinder	20	15	180
Brake tube flared end fittings to master cylinder	15	11	130
Master cylinder to Master-Vac	28	20	250

GENERAL INFORMATION

The P.B.R. tandem master cylinder is of the compensating type with integrally cast dual reservoirs. The master cylinder consists of a front and rear piston (in tandem), the front outlet on the master cylinder actuates the rear brakes. The two rear outlets on the master cylinder actuate the front disc brakes.

Provision is made internally for fitment of an external brake warning light switch to the tandem master cylinder body. However, the external switch and associated wiring

are not fitted to these vehicles and a plug is installed in lieu of the plastic switch assembly.

The tandem master cylinder is inclined at 34° on the vehicle and a plastic extension reservoir is fitted to the existing integrally cast reservoirs to accommodate this angular condition. The plastic reservoir acts as a common storage for both integrally cast reservoirs and the actual fluid level can easily be seen through the plastic. In the event of failure in one brake circuit, fluid will always remain in the other integrally cast reservoir. The rear reservoir also supplies fluid for the hydraulically operated clutch on manual transmission vehicles.

MASTER CYLINDER OPERATION

The tandem master cylinder unit separates the front and rear brake hydraulic systems. If one hydraulic system fails, the other, either front or rear will operate to retard the vehicle.

Normal Operation

When the brake pedal is depressed the primary piston moves forward compressing the primary return spring and simultaneously moving the secondary piston. This occurs because of the difference in spring tension between primary and secondary piston return springs (the former is stronger).

As the pistons and primary seals move past each compensating port, fluid is displaced from the master cylinder outlets to the wheel cylinders and pressure in each of the hydraulic circuits increases. Under normal conditions the fluid pressure developed in the primary or front brake circuit (between the secondary and primary pistons) supplies the force required to operate the secondary or rear brake circuit. The fluid pipes to the front and rear brakes are separated completely and both systems operate simultaneously and in a balanced manner to retard the vehicle.

Rear Brake (Secondary Circuit) Failure

As the brake pedal is depressed the primary piston forces the secondary piston forward until it bottoms in its bore (there is no pressure in the secondary circuit). Once the secondary piston has bottomed, pressure is developed in the primary circuit which operates the front brakes to retard the vehicle.

Front Brake (Primary Circuit) Failure

As the brake pedal is depressed the primary piston moves forward until it contacts the secondary piston (there is no pressure in the primary circuit.)

This provides mechanical actuation of the secondary piston which pressurises the secondary circuit and applies the rear brakes to retard the vehicle.

MASTER CYLINDER OVERHAUL

Disassembly

(1) Clean the outside of the master cylinder and remove reservoir cap. Discard any brake fluid that remains in the cylinder.

(2) Hold cylinder by mounting flange in a vice equipped with soft jaws.

(3) Unscrew hexagon nut located inside plastic reservoir. Remove nut, washer and stiffening plate from inside reservoir.

(4) Remove plastic reservoir and seal used between master cylinder and plastic reservoir.

(5) Depress and hold the primary piston 12 mm (0.5") down the bore and remove the long stop bolt located in the primary reservoir.

(6) Remove the primary piston assembly from the master cylinder bore.

NOTE: Do not remove the screw of the primary piston return spring assembly. This assembly is factory set and should not be dis-assembled.

(7) Remove secondary piston from the master cylinder bore.

*** IMPORTANT. THESE SEALS MUST BE ASSEMBLED IN THE DIRECTION AND POSITIONS SHOWN.**

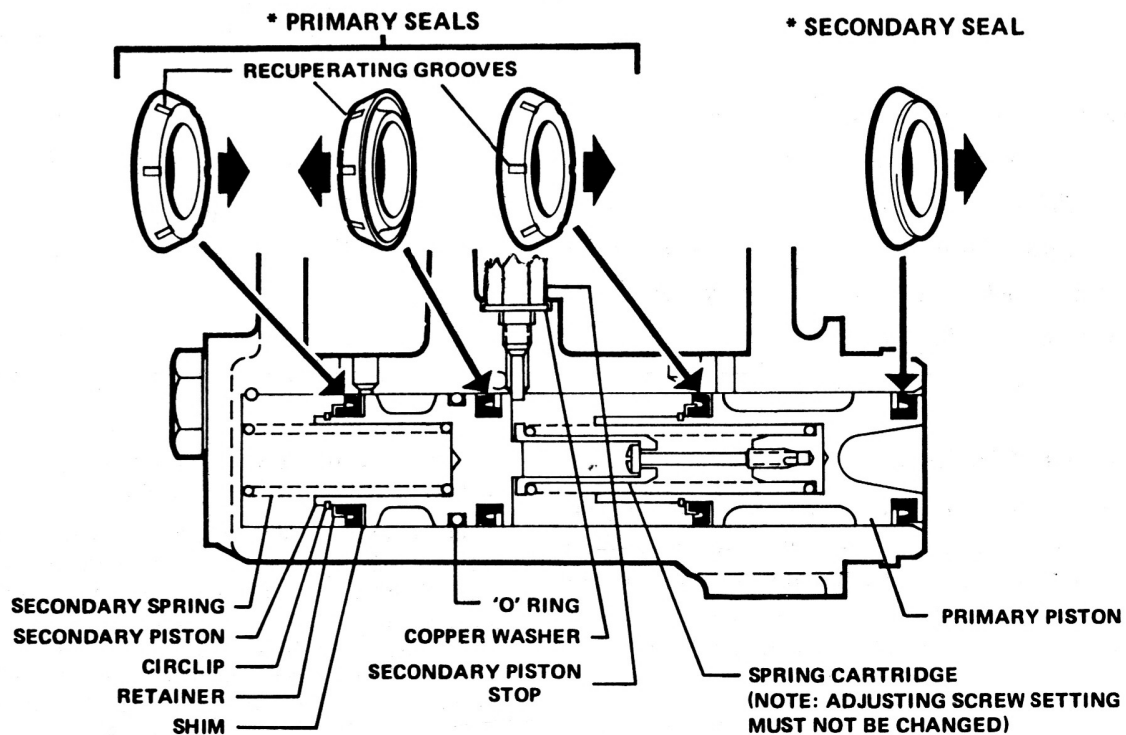


Fig. 1—Cross sectional view of PBR Tandem brake master cylinder assembly

(8) Unscrew the plug fitted in lieu of a brake light warning switch from the side of the master cylinder, then remove the plug from the end of the cylinder and withdraw the differential pressure piston assembly.

Inspection

(1) Clean all parts in clean methylated spirits, and inspect the parts for chipping, excessive wear or damage.

(2) Check all recesses, openings and internal passages to be sure they are open and free from foreign matter. Use an air hose to blow out dirt and cleaning solution. Place all parts on a clean tray or paper.

(3) Inspect the master cylinder bores for signs of etching, pitting, scoring or rust and if in poor condition, replace the cylinder.

NOTE: This cylinder must not be honed. The anodised finish on the bore will be removed resulting in rapid wear and subsequent failure of the master cylinder.

Assembly (Fig. 1)

NOTE: When using a master cylinder repair kit, install all the parts supplied. Figure 1 shows the correct assembly of the internal parts.

(1) Before assembly, lubricate all internal components and master cylinder bores with recommended brake fluid.

(2) Install new 'O' ring seal into the smaller of the two grooves at the end of the secondary piston. Into the second groove, install one of the three identical seals, ensuring that the seal lip faces away from the 'O' ring seal.

(3) Install a shim and one of the three identical seals with flat side of seal against shim and shim against flange on secondary piston which contains the six small compensating holes.

(4) Fit seal retainer over end of secondary piston, then assemble square section circlip into groove to ensure retainer, primary seal and shim are in position.

NOTE: Ensure circlip fits correctly into circlip groove.

(5) Install and secure a shim, one of the three identical seals, retainer and circlip onto the primary piston as in Steps 3 and 4.

(6) Into the groove on the other end of the primary piston, install the secondary seal with the lip towards the piston flange containing the six small compensating holes.

(7) Hold master cylinder by mounting flange in vice equipped with soft jaws.

(8) Fit secondary return spring into end of secondary piston and, spring end first, carefully install piston assembly into main bore.

(9) Fit primary return spring assembly into end of primary piston ensuring that the end of the spring assembly containing the large hole protrudes out of the piston, and then carefully install piston assembly into main bore, spring end first.

(10) Depress and hold primary piston 12 mm (0.5") down the main bore, then install secondary piston stop bolt and copper gasket, then screw bolt the full length of thread by hand before tightening to the specified torque. If pistons and stop bolt have been assembled correctly into the main bore, the end of the primary piston will protrude approximately 0,80 mm (0.030") out of the bore.

NOTE: Failure to hold the primary piston down the bore may result in damage to the secondary piston (rear) primary cup (Fig. 1).

(11) Install the metal sleeve against the shoulder on the differential warning switch piston from the spring retaining hole end, followed by a new large 'O' ring (Fig. 2).

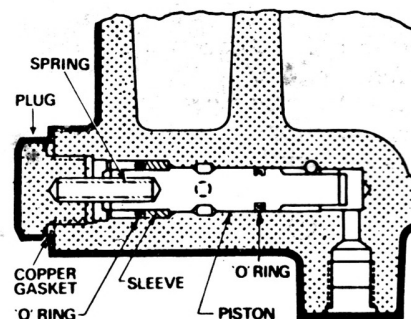


Fig. 2—Cross-sectional view of pressure differential piston assembly

(12) Install new 'O' ring into 'O' ring groove on the other end of the differential warning switch piston.

(13) Carefully assemble the piston into its bore, using a tubular tool the same cross section as the metal sleeve, installed over the end of piston and pushing on the large 'O' ring. Ensure that this 'O' ring is positioned at least 17 mm (0.67") down the bore.

(14) Fit coil spring into end of piston, then assemble copper gasket and end plug into end of bore ensuring that the spring locates into the hole in the end plug. Tighten the end plug to the specified torque.

(15) Install the plug in the side of the master cylinder and tighten to the specified torque.

(16) Install suitable adaptor fittings, then fit bleeder tubes with a residual pressure valve on each tube, tool E5C10A into the master cylinder outlet ports; fill the dual reservoirs with clean recommended brake fluid and 'bleed' the master cylinder bores using the procedure described in Section 1 — "Bleeding the Brake System." Remove the bleeder tubes and plug the master cylinder outlet ports to prevent fluid leakage.

(17) Install seal into the groove at the bottom of the plastic extension reservoir, and then position assembly on the master cylinder.

(18) Through the plastic extension reservoir opening, position the stiffening plate over the attaching stop bolt, ensuring that the plate locates on the three raised plastic pads.

(19) Assemble washer and nut and tighten to the specified torque.

(20) Assemble reservoir screw cap and seal ready for installation on the vehicle.

BRAKE MASTER CYLINDER

Removal

(1) Disconnect front and rear brake tube fittings from the master cylinder and plug the three master cylinder outlet ports.

NOTE: Position a clean absorbent cloth to prevent any brake fluid from leaking on the vehicle paintwork during this operation.

(2) Remove two bolts retaining master cylinder to the Master-Vac and withdraw the master cylinder assembly.

NOTE: The fluid supply pipe on vehicles equipped with hydraulic clutch must be disconnected and the rear reservoir carefully drained to prevent leakage of fluid.

Installation

(1) Prior to installation on the vehicle the tandem master cylinder must be "bled" of air bubbles as described in Section 1 — "Bleeding the brake system" using tool E5C10A.

(2) Position the master cylinder to the Master-Vac, and loosely install retaining nuts.

(3) Remove the plugs from the outlet ports and connect front and rear brake tube fittings to the master cylinder.

(4) Tighten master cylinder retaining nuts and brake tube fittings to the specified torque.

(5) Bleed vehicle brake system using the procedure described in Section 1 — "Bleeding the Brake System."