

# self-centring P.D.W.A. (pressure differential warning actuator)

5D 5a

## Introduction

The Pressure Differential Warning Actuator (P.D.W.A.), is a unit incorporated in dual hydraulic braking systems to provide a visual warning to the driver should part of the vehicle's braking system fail. The unit illustrated (Fig 1) features a self-centring piston and should not be confused with the unit described on Page 5D6.

## How it works

The unit is interposed between the tandem master cylinder and the operating brake cylinders, with the single piston held in balance under equal pressure from the separate systems acting on each end (Fig. 2). The pressure also acts on two 'O' rings, which serve as pressure seals, and two sleeves which carry the piston. Each sleeve presses against a circlip fitted to the piston.

If there is a loss of pressure in one system, because of a seal or pipe failure, the pressure in the other system will immediately push the piston to one side, lifting the switch plunger and causing the warning light to be illuminated (Fig. 3). As the piston moves towards the system without pressure, the circlip on the piston pushes the one sleeve and 'O' ring with it, whilst the piston moves through the other sleeve which is prevented from moving with the piston by the body of the switch; the second circlip therefore moves away from its sleeve (Fig. 3).

When the fault has been located and rectified equal fluid pressure will again be applied to both ends of the piston and sleeves. In the working system the pressure on the sleeve is neutralized as the sleeve is against the body of the switch. Because of the difference in areas, i.e. the piston on one side and the piston and sleeve on the other, the piston moves to the right as drawn (Fig. 3), until the circlip again contacts the sleeve when the piston is in balance. The self-centring of the piston is indicated when the warning light goes out.

## Servicing

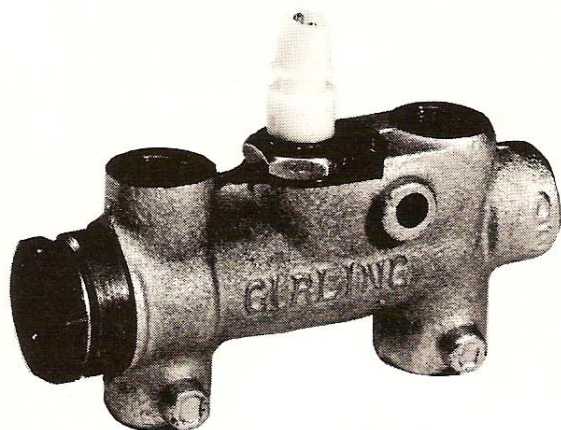
It is recommended that at intervals not exceeding 16,000km (10,000 miles), the electrical switch and bulb on the dashboard are checked by simulating a brake failure. This can be achieved by opening a bleedscrew to temporarily reduce the pressure in one of the systems when operating the foot pedal. The fluid level in the reservoir must be maintained during this operation and care must be taken to ensure that air does not enter the system. If faulty, the switch assembly or bulb should be renewed.

Before screwing a new switch into the unit, check the sleeves are central under the threaded port and the switch will not foul on the sleeves. If a resistance is felt unscrew the switch and recheck the position of the sleeves. Tighten the switch to a torque of 3 to 7 Nm. (2 to 5 lbf. ft.).

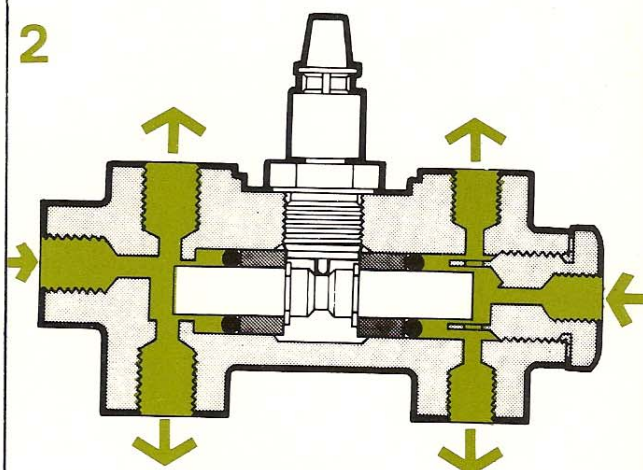
Except for replacement of the switch assembly, no attempt should be made to dismantle the unit. If a fault develops a new guaranteed unit should be fitted.

The recommended overhaul time for Private Car and Light Commercial Vehicles is 64,000km (40,000 miles) or three years, whichever is reached first. At this juncture, all hydraulic cylinders including the P.D.W.A., should be replaced by new guaranteed units.

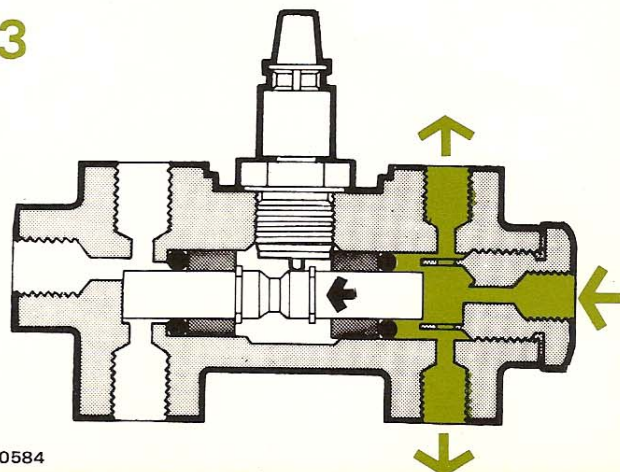
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## Introduction

The Pressure Differential Warning Actuator (P.D.W.A.) Fig. 1, is a device which is incorporated in dual hydraulic braking systems and is, in effect, two opposed cylinders with a common piston which is connected between the two separate systems. As long as both systems are functioning correctly, the piston is maintained in balance.

## How it works

For convenience in assembly, the piston is made in two parts (Fig. 2), and the longer piston of the two has a machined radiused groove acting as a ramp for the plunger of an electrical switch assembly. Provided the pistons remain in balance, the switch plunger is in the 'at rest' position, but if a failure of one system occurred the pistons would be forced from the central position and the switch plunger would be depressed, resulting in a glowing bulb on the dashboard.

The warning light would remain on until the pistons were re-set to allow the switch plunger to resume its normal extended position. Movement of the pistons in the event of a failure of any one part of the system is limited by the end plug and adaptor which acts as stops.

Some units have an aperture for re-setting the pistons mechanically and these units can be recognised by the rubber dust cover which is fitted. The re-setting of the pistons with units which do not incorporate the aperture is achieved hydraulically whilst bleeding the system after the fault has been corrected.

## Servicing

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Early units incorporated a switch and a ball as illustrated (Fig. 2); the ball seating in the groove in the piston. Later units used a different switch with a longer plunger and the ball was unnecessary. When fitting a new switch, care must be taken to ensure the ball, if fitted, is left in the unit. Tighten the new switch to a torque of 3 to 3.5 Nm (2 to 2.5 lbf.ft.).

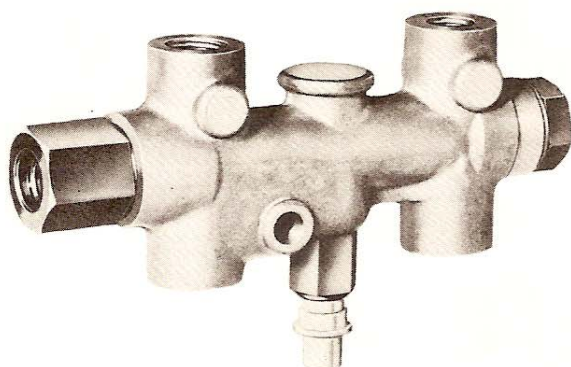
Except for replacement of the switch assembly no attempt should be made to dismantle the unit. If a fault develops a new guaranteed unit should be fitted.

The recommended overhaul time for Private Car and Light Commercial Vehicles is 64,000 km (40,000 miles) or three years, whichever is reached first. At this juncture, all hydraulic cylinders including the P.D.W.A. should be replaced by new guaranteed units.

## Bleeding the System

Bleed the system as described in Section 1, Page 1D1.

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