

# GIRLING

THE BEST BRAKES IN THE WORLD



GIRLING SA 245/12 (left)  
SA 245/13 (RIGHT)

P.V. RANGE #3114800  
2 rubber bush  
(Amer. Motors)

THE GIRLING P.V. RANGE OF HYDRAULIC DAMPERS TYPES P.V., P.V.A., P.V.X. and P.V.A.X.



Fig. 8. The Girling P.V.A. Type Damper, complete with Operating Linkage.

This is a completely new departure in Piston Type design, and has been designed and produced throughout by GIRLING LIMITED.

It possesses many distinct advantages over other piston types, foremost among which is the design of the pressure and recuperation valves, which are much less susceptible to the presence of dirt, or small particles of foreign matter, than earlier models. The operation of the damper is more constant at all temperatures, and the pre-set adjustable valves enable accurate relief pressures to be obtained.

Without doubt this is the most efficient piston type damper yet produced for road vehicle suspensions and it is backed by the reputation of GIRLING, long famous for THE BEST BRAKES IN THE WORLD.

This is one of the first new designs to be produced by GIRLING since commencing the manufacture of hydraulic dampers, and represents a major step forward in motoring comfort.

The general construction of the unit, Figs. 9 and 10, is extremely robust, comprising a cast-iron body, in which operate two cast-iron pistons flexibly linked together and actuated by a hardened steel rocker-arm bearing on hardened steel pads.

The cylinder and pistons being of the same material ensures that a constant clearance is maintained between pistons and cylinder walls at all temperatures, which contributes materially towards consistent performances.

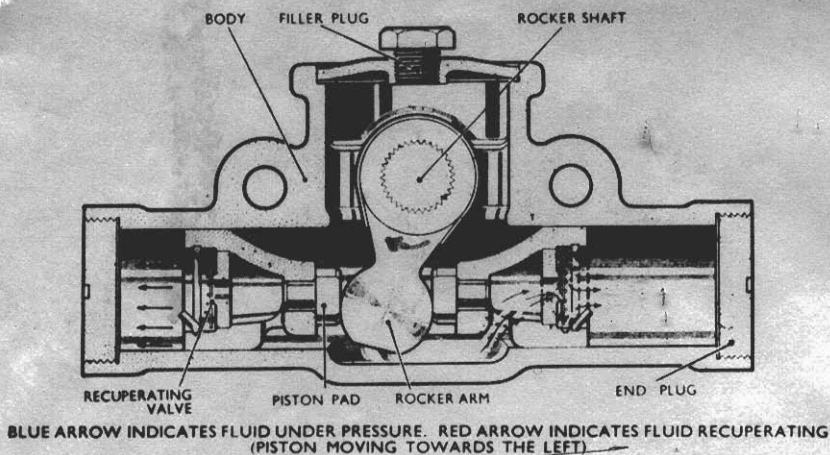


Fig. 9. Vertical Section through P.V. Type Unit. Arrows indicate flow of fluid with shaft rotating clockwise.

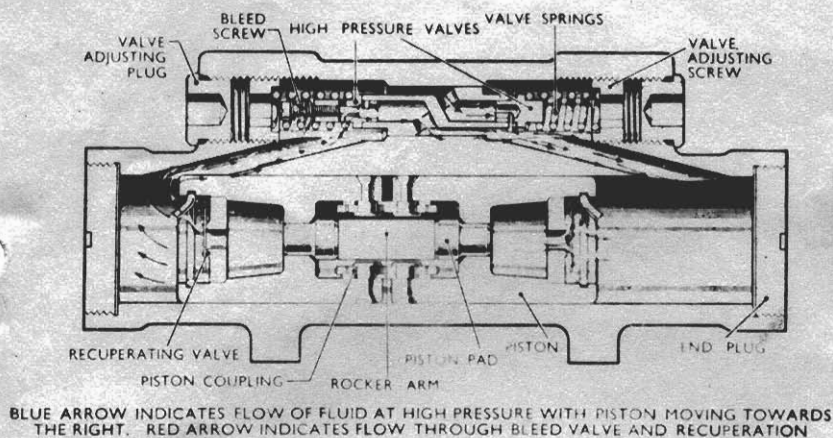


Fig. 10. Sectional view from underside of P.V. Unit.

The recuperation valves have been so designed that no flexing of the shim steel discs takes place in operation. This obviates fractured valves which frequently caused trouble in the earlier types.

The high-pressure relief valves in the P.V. range are located in a separate chamber in the main body of the damper, and are especially designed to facilitate accurate setting to the pressures required. They are far less susceptible to the presence of small particles of dirt or solid matter than the original disc valves employed in previous piston types, and by their location in a separate chamber, end to end discharge of the working chambers is assured, so that even at the highest piston speeds there will be positive and immediate filling of each working chamber in readiness for the next stroke in the reverse direction. Any wear between pistons and rocker is taken up by high-tensile steel spring connectors, and as there is a free and ample passage for fluid through the recuperating valve of the returning piston, there is a minimum of drag, which prevents the occurrence of hydraulic or mechanical knocks.

To seal the cylinders both ends are closed by special steel plugs screwed into the bores, seating on soft aluminium sealing discs which ensure complete closure and freedom from leaks.

The standard type of robust forged steel linkage is used, fitted with tight rubber bearings. This linkage is the same as used on previous types and P.V. type movements are interchangeable with the original P. and P.R. types when there is sufficient clearance between the valve chamber and the lever arm.

## OPERATION OF THE P.V. TYPE HYDRAULIC DAMPER

The flexing of the vehicle suspension causes rotary movement of the rocker, which actuates the pistons in the working chamber.

Movement of the piston towards the end of the chamber forces the fluid through a channel into the valve chamber, which is cast integral with the main body. On generation of sufficient pressure the fluid lifts the spring-loaded sleeve valve off its seating and escapes to the low pressure side of the main chamber.

While one piston is forcing the fluid at high pressure through the sleeve valve concerned, the pressure in the other cylinder falls, allowing the recuperating disc valve to open in order to recuperate the very small volume of fluid that has escaped past the piston, into the reserve chamber, thus maintaining the pressure chambers full of fluid ready for a change of direction of movement and reversal of the direction of flow of the fluid.

To control the bleed for slow movement of the rocker, a bleed valve is incorporated in the valve body. This valve is pre-set before leaving the factory, and operates in both directions.

The setting of the pressure and bleed valves is highly critical. This is carried out with extreme accuracy on special test rigs at our factory, and subsequently the adjustment is sealed with a screwed plug.

Under no circumstances should any attempt be made to interfere with these adjustments, as the riding qualities will be impaired and serious damage may be caused to the unit.

No responsibility can be accepted by GIRLING LIMITED for any units where this adjustment has been tampered with.

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## Service Instructions for the Maintenance of Girling Hydraulic Dampers

### PISTON TYPES (All Models)

#### Maintenance

The only attention required on the chassis is the periodical examination of the anchorage to the chassis, the fixing bolts being tightened as required.

Connecting Link Bearings will last for very considerable periods but are normally renewed when complete overhauls are being carried out. Details of these operations are given later in the instructions.

Dampers should be topped-up with WAKEFIELD GIRLING Piston Type Damper Thin Oil occasionally.

#### Testing

When the question of vehicle suspension is under consideration, the chassis springs and tyre pressures should be checked.

If the Dampers do not appear to function satisfactorily, an indication of their resistance can be obtained by carrying out the following check:—

Remove the dampers from the chassis.

Bolt to a suitable plate, using fixing lugs, and hold plate in vice. (Holding the damper directly in the vice will distort the unit).

Move the lever arm up and down through its complete stroke, when an even resistance throughout should be felt.

If the resistance is erratic, and free movement of the lever arm is noted, it may indicate lack of fluid.

If the addition of fluid (added as described in the instructions) gives no improvement, a replacement damper should be fitted.

Too much resistance—when it is not possible to move the lever arm slowly by hand—possibly indicates a broken internal part, or a siezed piston, in which case the assembly should be renewed.

#### Topping-up with Fluid

Remove the complete assemblies from the chassis.

Place in a vice using suitable clamping plate.

BEFORE REMOVING THE FILLER PLUG, COMPLETELY CLEAN THE EXTERIOR OF THE DAMPER, AS IT IS MOST IMPORTANT THAT NO DIRT OR FOREIGN MATTER ENTERS THE MOVEMENT THROUGH THE FILLER PLUG HOLE.

Use only Girling Piston Type Damper Thin Oil. In this connection the correct oil is made up and distributed on our behalf by Messrs. C. C. Wakefield Ltd.

While adding the fluid, the lever arm must be worked throughout its full stroke to expel air from the pressure chamber.

Fill to the bottom of the filler plug hole. (The unit cannot be overfilled).

When refitting damper to the chassis, after bolting in position, but before reconnecting link, work the arm through the full stroke several times to make sure no air is present.

If for any reason it is not possible to remove the dampers from the chassis, these precautions are essential:—

- (a) The unit must be thoroughly cleaned before the filler plug is moved.
- (b) A shield should be placed over the unit before the plug is removed in order to protect the unit, and not removed until the filler plug is replaced.
- (c) The filler can must be absolutely clean internally and externally (restrictions do not at present allow the supply of small cans with a special filler spout).
- (d) Use only Girling Piston Type Damper Thin Oil, available from:—Messrs. C. C. Wakefield Ltd., 46, Grosvenor Gardens, London, W.1. or from all authorised GIRLING SERVICE AGENTS.

#### DIRECT ACTING TYPES

As these units are completely sealed, no topping up or other service is required apart from the occasional replacement of the rubber bushes, which can be carried out without any special tools.