Introduction

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System 1

Front Pump
Front, Vertical Accumulator
Inboard, Large Reservoir

Operates: - Rear Brakes and Levelling (ABS cars)
- Front brakes front calipers, rear brakes upper cylinders, levelling (cars without ABS)
Fault: - Right Hand Indicator Illuminated (ABS cars)
- No 1 (Left) indicator Illuminated (cars without ABS)

System 2

Rear Pump
Rear, Horizontal Accumulator
Outboard, Small Reservoir

Operates: - Front brakes only (ABS Cars)
- Front Brakes Rear Calipers and Rear Brakes Lower Cylinders (cars without ABS)
Fault: - Flashing Left Hand "STOP" indicator and Right Hand indicator illuminated (ABS cars)
- No 2 (Right) indicator Illuminated (cars without ABS)

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Introduction

WARNING

Use only hydraulic system mineral oil (LHM) to replenish the braking and levelling systems.

Do not use brake fluids (Castrol RR363, Universal, or any other type). The use of any type of brake fluid, even in very small amounts, will cause component failure necessitating extensive rectification to the braking and levelling systems of the car.

Always ensure before fitting any seals, hoses, pipes, etc., that they are suitable for a mineral oil system. For details of correct component identification reference should be made to Section G3 of this Workshop Manual.

Always ensure that two sealed containers of **hydraulic system mineral oil (LHM)** are fitted in the luggage compartment.

Always ensure that no foreign matter enters the systems when work is being carried out.

This Chapter covers the components for the two independently power operated braking systems, the levelling system, and the mechanically operated parking brake.

In order to protect against claims of liability for hydraulic system contamination, it is recommended that the hydraulic system mineral oil is tested for contamination prior to work being undertaken, preferably in the presence of the owner or his/her representative. The procedure for carrying out the test is described in Section G3.

It is important that the test is carried out even when the hydraulic system mineral oil is to be renewed as this will not prevent the deterioration of components which have been in contact with contaminated mineral oil.

Hydraulic systems

1. Cars fitted with an anti-lock braking system

The braking systems consist of two independent circuits. System 1 operates the rear brakes and levelling. System 2 operates the front brakes only.

The Bosch anti-lock brake control system, consists of a speed sensor fitted to each wheel, an electronic control unit (ECU), and a three channel hydraulic modulator.

The speed signals from the sensors are continually processed by the ECU. When the brakes are applied, the wheel deceleration, acceleration, and slip are determined by the ECU. Signals from the ECU are fed to the 3-way solenoid valves in the modulator. The modulator then either increases pressure, holds pressure, or decreases pressure to the brake calipers.

The rear wheels are controlled jointly, using the 'select low' rear control principle.

Failure of the anti-lock braking system is indicated by an amber warning lamp on the facia, and does not affect normal braking performance.

2. Cars not fitted with an anti-lock braking system

The braking systems consist of two independent circuits. System 1 operates the front brake calipers on the front road wheels, the upper cylinders on the rear road wheel brake calipers, and the rear levelling. System 2 operates the rear brake calipers on the front road wheels and the lower cylinders on the rear road wheel brake calipers.

All cars

Disc brakes are fitted to all wheels.

Pressure for the systems is supplied by two hydraulic accumulators, mounted on the 'A' bank side of the engine, except for the Bentley Turbo R where the accumulators are mounted on the 'B' bank side of the engine. The accumulators are charged by engine operated hydraulic pumps. The hydraulic pump situated in front of the engine air intake manifold supplies hydraulic mineral oil to the front, vertically mounted accumulator (System 1). The hydraulic pump situated at the rear of the engine supplies hydraulic mineral oil to the rear, horizontally mounted accumulator (System 2).

Each accumulator sphere is divided into two chambers by a diaphragm, a charge of nitrogen gas being applied and retained in one chamber by the diaphragm.

As an accumulator commences to be charged with hydraulic system mineral oil from its hydraulic pump, only a small amount of hydraulic system mineral oil is required to be pumped into the other chamber to raise its pressure to that of the initial charge of nitrogen. Hydraulic system mineral oil will continue to be pumped into this chamber against steadily increasing pressure as the diaphragm is lifted, compressing the gas above it, until the pressure regulator in the accumulator valve housing operates and unloads the hydraulic pump by allowing the hydraulic system mineral oil to by-pass back to the reservoirs. The pressure of hydraulic system mineral oil stored in the sphere is maintained by the gas pressing against the diaphragm, the pressure reducing as hydraulic system mineral oil is used, until the regulator allows the pump to recharge the sphere.

Spheres similar to those used on the accumulator but with lower nitrogen gas pressure are incorporated into the rear suspension struts, the gas under pressure acting as a spring. Hydraulic system mineral

oil fed from System 1 accumulator, flows into or out of the suspension strut spheres as varying loads are applied to the car. The quantity is controlled by the levelling valve, with hydraulic system mineral oil exhausted from the suspension spheres being returned to the reservoir.

To ensure that the braking system has priority over the rear suspension, a pressure priority valve is incorporated into System 1 high pressure line. If the pressure in the system falls unduly the priority valve will close and isolate the suspension system. This allows the available pressure to be utilised for braking purposes.

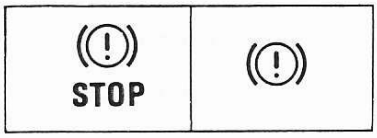
Also incorporated into System 1 is a minimum pressure valve. The purpose of this valve is to retain a predetermined pressure in the rear suspension strut spheres when the engine is switched off and the car unloaded. This retention of pressure reduces the time and amount of pressurized hydraulic system mineral oil required to fully charge the hydraulic systems upon the initial starting of the engine.

A pressure switch is incorporated into both System 1 and System 2 high pressure lines. The function of these switches is to illuminate the warning panels situated on the facia when the hydraulic system(s) pressure falls below acceptable working limits.

A seepage return hose is fitted between the minimum pressure valve and the levelling valve. This seepage return hose allows the designed seepage within the levelling valve to return to the reservoir.

Facia warning lamps

1. Cars fitted with an anti-lock braking system



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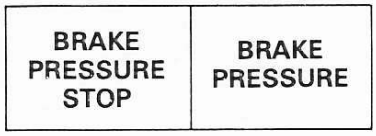
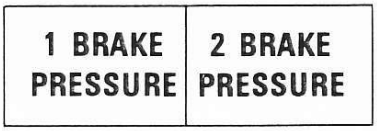


a. If there is a fault in the rear braking system only (System 1), the right-hand pressure panel will be illuminated. The car can be driven with care.
b. If there is a fault in the front braking system only (System 2), the STOP panel will flash and the right-hand pressure panel will be illuminated. **The car must not be driven.**
c. When both warning panels are **flashing**, there is a fault in both braking systems. **The car must not be driven.**

2. Cars not fitted with an anti-lock braking system



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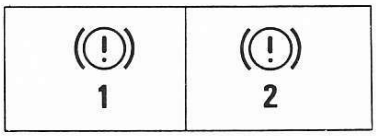

a. If only one warning panel is illuminated, the fault is in that particular system (either System 1 or System 2). The car can be driven with care.
b. When both warning panels are illuminated, there is a fault in both braking systems. **The car must not be driven.**