Section G2

Special precautions

Important

The hydraulic systems operate at high pressure. Before attempting any work on the hydraulic systems of the car service personnel must note carefully the contents of this section and be fully conversant with the precautions required to ensure adequate safety and correct system operation.

Before any work except specified tests, is carried out on the hydraulic systems, depressurisation of the systems must be carried out.

With the exception of bleed screws; pipes and components must never be removed when the systems are in a pressurised state.

Depressurising a system

Method 1

Switch on the ignition and pump the brake pedal 50 or 60 times until the warning panels marked 1 BRAKE PRESSURE and 2 BRAKE PRESSURE on the instrument facia are illuminated. Switch off the ignition.

On cars destined for Australia, Canada and the USA it will be necessary to pump the brake pedal an extra 30 times after the warning panels have illuminated to ensure complete depressurisation of the systems.

Method 2

With the ignition switched off, place a length of bleed tube over the bleed screw in the accumulator valve body; hold the free end in a clean container.

Open the bleed screw slightly and bleed until fluid no longer flows from the accumulator. The bleed screw should only be opened fractionally otherwise accumulator pressure will force the tube off the bleed screw.

Close the bleed screw, remove the tube and repeat the operation for the other accumulator.

Depressurise the height control rams by placing a bleed tube on each ram bleed screw in turn, opening the bleed screws and allowing the fluid to bleed into a clean container.

Bleeding the hydraulic systems

It is recommended that the gear change thermal cut-out is removed from the fuseboard beneath the facia, to isolate the electric gear change whilst the systems are bled.

Hydraulic fluid

It is important that only the approved fluid should be used (see Chapter D Lubricants). Under no circumstances should a mineral oil be substituted for the genuine fluid.

It must be noted that brake fluid is hygroscopic, i.e. the fluid will absorb and chemically combine with water from the atmosphere.

Brake fluid which is contaminated by water will boil at a much lower temperature than fluid with no water content.

If the fluid is contaminated and the car is braked excessively or very hard from high speeds, there will be a tendency for the heat generated by the brakes to boil the fluid, which could result in vaporisation of the brake fluid causing a delay in braking response to brake pedal actuation.

This situation can be dangerous in that although full braking will ultimately be available, an excessive delay can be misinterpreted as ineffective brakes and so confuse the driver into otherwise unwarranted actions.

To eliminate possible contamination of the brake fluid it is essential that the fluid is exposed to the atmosphere for the absolute minimum of time. It should always be stored in and used direct from small sealed containers. When the systems are replenished, the two reservoir covers and the container cover must be replaced immediately.

Cleanliness

For the correct functioning of the hydraulic systems meticulous care should be taken to ensure complete cleanliness at all times.

Since both the braking system and the height control system employ components which have very fine manufacturing limits, the ingress of even very fine particles of foreign matter could have very serious effects on the operation of the systems.

Care must therefore be taken to ensure that at all times only clean fluid of the specified type (refer to Chapter D) is used in the systems and that any overhauled units or components have not been exposed to contamination before they are fitted to the car.

Contact with mineral based oils must be avoided at all times as these oils have a detrimental effect on the rubber seals used in the hydraulic systems.

Removing components

Prior to disconnecting any pipes or removing hydraulic components from the car, the area around

the pipes and components should be thoroughly cleaned. Particular attention should be given to the localised areas around the pipe unions and their corresponding ports.

Whenever units, pipes or components are disconnected from the hydraulic systems all open ports and pipe ends must be blanked off immediately to avoid contamination of the systems.

It is stressed that the clean condition of any blanks used is equally as important as the clean condition of the components they seal.

The size and type of each blank is as follows:

Male	3/8 in. U.N.F.
Female	3/8 in. U.N.F.
Male	7/16 in. U.N.F.

There are two types of female push-on blanking cap.

Quantities of blanks may be obtained, on request, from the Parts Department at Crewe.

In addition, special pressure blanks are available, capable of withstanding full hydraulic system pressure, for use during testing and fault diagnosis procedures where it may be necessary to blank off a pipe or component and then charge the systems.

Note
Masking tape and/or cork bungs do not constitute blanks.

The Part Numbers of the pressure blanks listed in the Tools Catalogue are as follows:

RH 7310	Male	3/8 in. U.N.F.
RH 7809	Female	3/8 in. U.N.F.

When used, these blanks must be torque tightened to the figures quoted for the pipe unions which they replace.

Cleaning components
Components which have been removed should be thoroughly cleaned before replacement.

Blow dry compressed air through all pipes. Rubber pipes, sealing rings and other components should be washed in methylated spirits and then dried with dry compressed air.

Cloths, even the lint free type, should never be used to clean hydraulic components or sealing rings.

Methylated spirits is the only recommended cleanser; trichlorethylene, paraffin or petrol must never be used to clean hydraulic components.

Note
When rubber seals are washed in methylated spirits, they must not be allowed to soak, as prolonged immersion in spirit could have a detrimental effect.

Hydraulic system - General maintenance
When the hydraulic reservoir and systems are drained completely always fill with fresh clean fluid of the specified type. Refer to Chapter D for the fluid specification.

This procedure will require a complete bleeding operation to be performed afterwards to remove all air from the systems.

Servicing rubber components
In the interest of safety, the rubber components used in the hydraulic systems have been allotted specific 'life' mileages at the completion of which, or at the nearest service, it is recommended that the components are renewed. (Reference should be made to Service Schedule Manual publication number T.S.D. 4117 for this information.)

Seals, other than dust covers, used in the hydraulic systems should only be lubricated with clean brake fluid of the approved type.

Hydraulic accumulator spheres
The hydraulic accumulator spheres are charged on one side of the diaphragm with nitrogen gas (see Chapter G6) through a one-way charging valve, the valve being situated in the lower end of the sphere.

Replacement spheres are supplied in an uncharged state and therefore must be charged by the Franchise holder before being used to replace existing faulty spheres.

Exchange spheres are supplied complete with charging valve cap; a warning plate and locking washer are supplied loose. A label is attached which reads 'Uncharged - Remove label on charging and attach warning plate'.

It is of the utmost importance that, when the sphere is charged, the warning plate is fitted below the charging valve cap (see Fig. G10).

Spheres must never be transported in a charged state, they must always be discharged before despatch.

Service Personnel are advised that spare accumulator spheres should be charged and leak tested immediately on receipt and then stored in a charged condition.

This ensures that the storage period is utilised as a time/leakage test so that when a sphere is removed from store and the pressure of the nitrogen is tested after fitting, it can be seen whether the sphere is still fully charged with nitrogen.

Spheres which have been correctly charged and successfully leak tested before storage and then show a loss of pressure in excess of 1,75 kg/sq.cm. (25 lb/sq.in.) when tested prior to fitting, must be rejected. The sphere should be recharged and leak tested again to determine the cause of leakage. If the leak persists, the sphere should be discharged and dismantled and the diaphragm checked and renewed if necessary (refer to Section G6).

Fitting replacement units
Replacement hydraulic units are tested and blanked off before being despatched from the factory.

It is advisable, when fitting a replacement unit, that when the unit has been placed in position and the blanks removed, the fluid in the unit is allowed

to drain before the pipes are connected.

When drained, the pipes should be connected and the appropriate bleeding operations carried out.

Note

The fluid should not be blown out; allowing it to drain is sufficient.

Storage and transportation

The care taken to prevent contamination of components during storage or transportation is extremely important.

Replacement parts, pipes and units must be correctly and securely sealed with the recommended blank which should not be removed until immediately prior to fitting. The replacement parts must also be adequately protected from dust or damage.

Sealing rings and rubber pipes in store should be protected from dust, light and heat.