

Additional pipe and fittings are available where necessary. On some vehicles where space is limited it will be necessary to use banjo and bolt fittings on the tapings of the servo slave cylinder to avoid severe bends in the brake pipe. (See fig 4)

Note: No attempt should be made to cut and reflare existing brake pipes in situ as problems could arise with contamination through ingress of foreign matter, i.e. swarf.

Vacuum hose, In line non-return valve (where fitted) and fittings.

The servo unit must be connected via a vacuum hose, running from the plastic non-return valve located in the servo shell to a suitable vacuum source eg the engine induction manifold or vacuum pump. On some vehicles the manifold is already tapped and fitted with a removable plug.

If so remove the plug, and check the thread size. If the thread size is 1/8" BSP taper, the adaptor provided in the kit can be used directly. If the thread is not suitable, refit the plug and drill and tap a new hole as follows.

Drill the top wall of the manifold 5/16" and tap with a 1/8" BSP taper tap. The manifold should be removed from the engine for this operation.

Fit the adaptor provided in the kit. (No washer is required - the taper thread is self-sealing)

In a convenient position, preferably at the highest point in the vacuum hose run, an in-line non-return valve is advisable on high performance vehicles. Cut the hose and connect up the two sections to the valve unit. Secure with hose clips supplied. Ensure that when fitted, the arrow on the non-return valve is pointing towards the servo. (See fig 4)

Important: to protect the servo unit and non-return valve from fuel contamination, especially on a petrol-engined vehicle, a 'U' trap must be formed in the vacuum hose route.

It is essential the vacuum hose inclines downwards from the servo and that the 'U' trap is formed below the level of the servo and the in-line non-return valve where fitted, i.e. by looping it between the inlet manifold and non-return valve so that point 'X' is lower than points 'Y' and 'Z' as shown (see fig 4). Where the vacuum hose traverses the engine secure in position with plastic ties. Secure hose connection at the servo with the remaining hose clip.

Bleeding and testing the system

- 1 Reconnect the battery
- 2 Using **new DOT 4 brake and clutch fluid**, or fluid as recommended by the vehicle manufacturer (conforming to SAE J1703 specification) bleed the braking system in accordance with the appropriate vehicle manufacturer's workshop manual. With the system properly bled, firm resistance should be felt at the brake pedal. If difficulty is experienced in achieving a 'good bleed', then the bleeding process will be assisted by 'cracking open' the brake pipe tube nut at the servo outlet connection whilst depressing the brake pedal. Surround this connection with clean, 'fluff free' cloth to capture escaping brake fluid. When the pedal is fully depressed retighten tube nut. Repeat this process several times if necessary. When complete, top up the fluid reservoir to the correct level.
- 3 Start engine & apply brakes several times. Whilst an assistant depresses the brake pedal, re-check for fluid leaks particularly at new connections. Road test the vehicle and finally check again for fluid leaks.

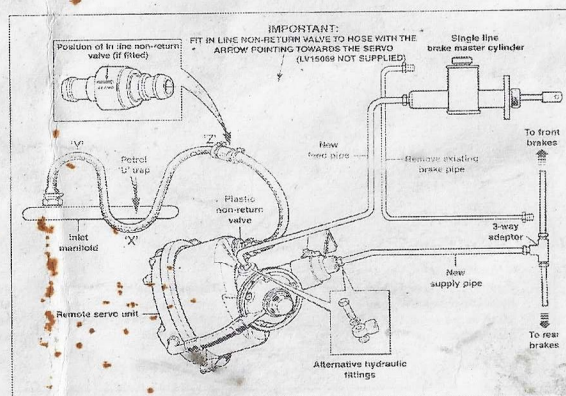


Fig. 4 Schematic layout of brake servo unit and relative components

Caparo

AP BRAKING

Caparo AP Braking to
Brake House
Tachbrook Road
Leamington Spa
Warks
CV31 3SF

Fitting Instructions for Type 6 Remote Servo Installation Kits

(For single line Braking systems)

General fitting instructions

To ensure correct installation of the remote vacuum service unit, thoroughly read and adhere to the fitting instructions prior to carrying out any work on the vehicle.

Introduction

The vacuum servo unit is incorporated into the hydraulic braking system, remote from the master cylinder, as an intermediate stage operating between the master cylinder and the brake assemblies. The two main parts of the servo unit consist of the vacuum servo mechanism and the hydraulic slave cylinder assembly. These component parts are bolted together so that the slave cylinder piston is in line with, and is operated directly, by the servo push rod.

A plastic non-return valve is fitted into the vacuum shell, and an integral air cleaner is incorporated to prevent foreign matter entering the air control valve chamber.

The servo unit is designed to give no assistance with very light brake application. In the absence of servo assistance due to loss of vacuum, an unrestricted passage for the fluid will exist. The brakes can still be applied, therefore, by the normal action of the pedal on the brake master cylinder, but this would demand heavier foot pressure to achieve the same degree of braking as with servo assistance. When this servo unit is used to replace a different servo, or is installed on a vehicle previously without a servo, the following installation recommendations must be observed.

Note:

Not for use on vehicles with tandem or dual line braking systems except for specific applications where twin servo units are fitted. In this instance, units must be replaced in pairs to maintain the correct brake balance.

Important:

Fitting a brake servo unit will not make faulty brakes reliable. Any fault in the vehicle braking system must be rectified. Therefore before fitting the new servo unit, ensure the braking system is in good working order.

Note:

- A. When changing brake parts the need for absolute cleanliness is essential.** Therefore ensure that hands are free of grease and dirt. Always use a fluff-free cloth or paper towelling for cleaning purposes.
- B. Ensure a sufficient quantity of DOT 4 brake and clutch fluid** is available for bleeding the braking system and topping up the reservoir. Where possible, brake fluid should always be stored and dispensed from the original tin or bottle. Care must be taken to prevent both dirt entry and contamination, especially in the mouth area of the master cylinder reservoir during this operation. **NB Caparo AP Braking do not recommend the use of silicone fluid in any Caparo AP Braking products.**

Prior to fitment of the brake servo unit or removal of an existing servo installation, thoroughly clean the outer surfaces of the unit (where applicable) and around all relevant hydraulic pipe connections, using methylated spirits as a solvent. **Do not use petroleum based products, (petrol or paraffin), for cleaning braking system components.** On the majority of vehicles, a 3-way adaptor is used, into which are coupled the supply pipe from the master cylinder outlet port and the pipes feeding both front and rear brake assemblies.

Removing Existing installation

- 1 Disconnect the battery
- 2 Disconnect and remove the vacuum hose pipe that connects the servo unit to the vacuum pump / manifold.
- 3 Disconnect, remove and discard the hydraulic feed pipe from the master cylinder outlet port to the 3-way adaptor. Seal off the hydraulic connection points to prevent loss of brake fluid and ingress of foreign matter
- 4 Unbolt the existing servo unit together with any mounting brackets, where applicable and remove from vehicle.

Note:

Brake fluid is injurious to paintwork, therefore when removing the servo unit from the vehicle, care should be taken to ensure that no fluid is spilt onto the painted surface of the bodywork. Should fluid spillage occur, wash off immediately with copious amounts of cold water.

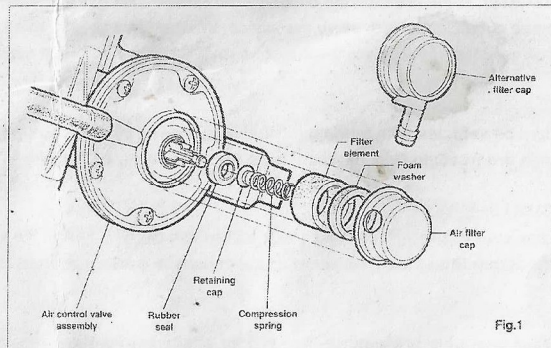
Where the hydraulic piping, supplied in the fitting kit, needs to be shortened, it will be necessary to use a Bundy flaring tool to reform the pipe end.

Location of new servo unit and brackets

- 1 It is essential that the servo unit is fitted to the integral body or chassis (i.e. **not to the engine**) thus preventing the brake pipes being subjected to vibration or flexing.
- 2a It is an advantage to locate the servo within the engine compartment wherever possible to safeguard the unit and keep the hydraulic pipe runs to a minimum length.
- 2b Should it become necessary to fit the servo unit to an area on the vehicle prone to dirt, grit or water ingress, e.g. under body wings, it is recommended that an extension hose be fitted to the air control valve inlet by carrying out the following modification, **prior to installation**.

Method

Carefully prise off the plastic air filter cap. Note components retained by the cap, which is a snap fit, may become dislodged during removal. Therefore care **must** be taken to prevent parts becoming lost or damaged. Extract the foam washer from within the existing air filter cap and replace. Fit the air filter cap to the air control valve ensuring that the rubber seal, seal retaining cap, compression spring and filter element are all correctly located (see fig 1 for details). Connect one of the vacuum hoses from the kit to the inlet pipe on the filter cap, and secure with the clip provided. On installation, locate the other end of the vacuum hose in a suitable position away from dirt or grit. **Please note: Alternative Cap included only in HR118 Kit.**



- 3 Ensure the hydraulic slave cylinder is at least six inches away from any part of the vehicle exhaust system, otherwise fluid vaporisation from local heat could occur.
- 4 The servo unit need not be mounted below the level of the brake fluid reservoir, but keep the difference in height to a minimum.
- 5 With the aid of the mounting brackets and fixings provided in the kit, install the servo unit with the hydraulic slave cylinder outlet port **inclined upwards between 25 and 45 degrees from the horizontal plane**. (See fig 2) The air control valve should be situated **at least 30 degrees below the centre** line to assist when bleeding the hydraulic system. (See fig 3).

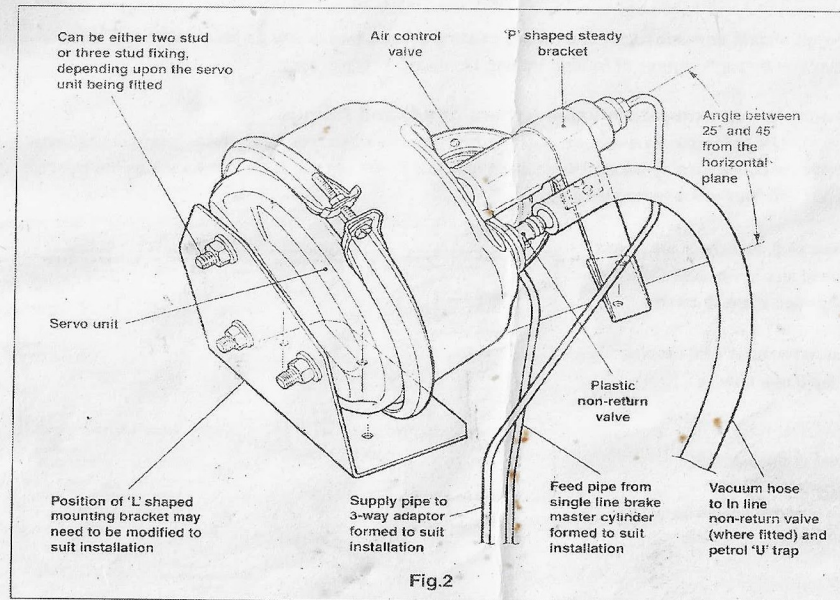


Fig.2

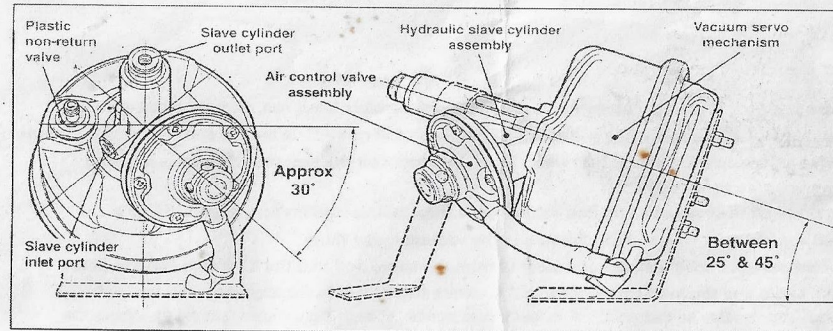


Fig.3

Fitting Hydraulic piping

With all relevant connection points clean and free from ingress of foreign matter, using the new Bundy piping supplied:

- a. Connect up the feed pipe from the brake master cylinder to the servo slave cylinder inlet port.
- b. Connect up the supply pipe from the servo slave cylinder outlet to the 3-way adaptor.

When bending brake pipes to shape, **great care must be taken to avoid kinking**. The best way to obtain a good curve is to bend the pipes smoothly round a mandrel of suitable diameter. Using existing clips on the vehicle, ensure pipes are properly secured and cannot chafe or foul other components. Where a long length of piping is fitted, e.g. from one side of the vehicle to the other via the bulkhead, secure the pipes to the bulkhead to avoid vibration.

continued