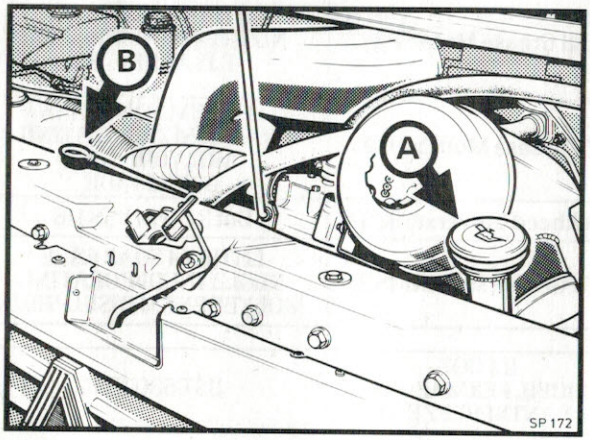
ENGINE OIL

Filler Cap (A)
Dip Stick (B)
Change oil when warm

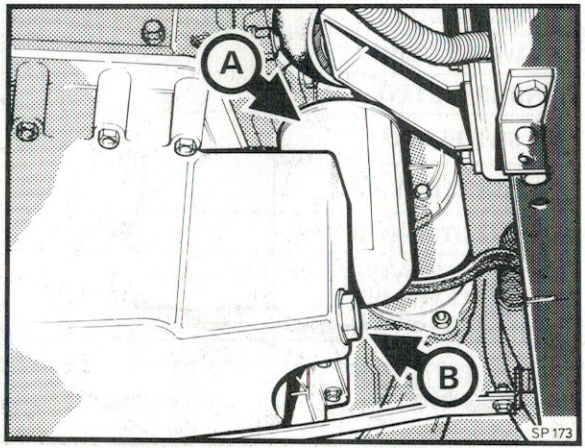
OIL FILTERS

To change, unscrew cartridge. Cartridge is not re-useable. When fitting new cartridge, lightly oil the seal and tighten by hand only. Run engine and check for leaks. Re-check oil level.

OIL FILTER (A)
DRAIN PLUG (B)



Oil Fill and Dip



Oil filter and drain plug – diesels

AIR CLEANER (A)

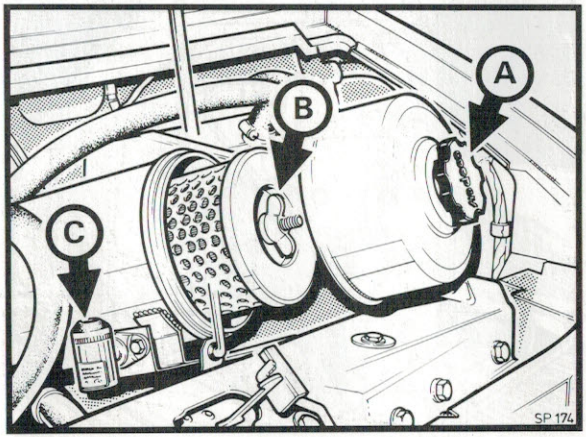
Unscrew knob (A) and remove cover. Unscrew wing nut (B) and remove element. Clean or change (see service schedules). Replace correctly.

AIR RESTRICTION INDICATOR (C)

Mounted on the side of the air cleaner body. A red warning indicator remains locked up after the engine has stopped if the air intake is restricted. Clean or change filter. Reset indicator by pressing button at base of indicator.

TO CLEAN THE ELEMENT

1. Carefully tap the side of the element against the palm of the hand to remove surplus dust.
2. Blow out any loose dirt or sand with compressed air, blowing along the pleats and in the opposite direction of the normal operating air flow through the element. Pressures in excess of 7 bar (100 lbf/in^2) should be avoided otherwise rupture of the pleats could occur.
3. Wipe the inside of the cleaner body with a clean damp cloth.
4. Refit the cleaned or new element and top cover.



Air cleaner and restriction indicator

COOLING SYSTEM

General

The radiator header tank is situated to one side of the engine compartment beneath the bonnet.

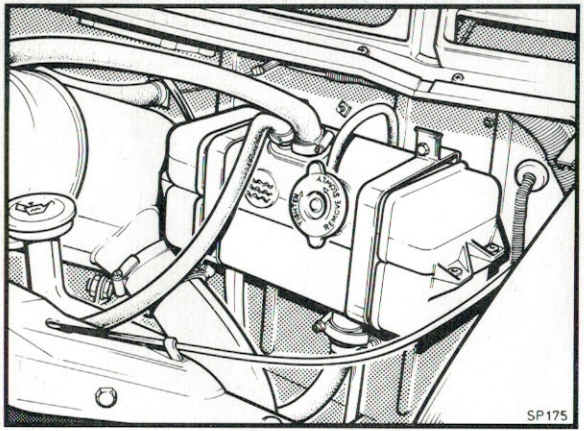
No radiator drain plug or tap is provided.

Cylinder block drain plugs are located on the engine as follows:–

6 Cylinder petrol engine.
Right hand side immediately to rear of the oil filter.

4 Cylinder diesel engine (illustrated).
Rear right hand side near clutch release lever.

WARNING. If it is necessary to remove the pressure cap from the header tank whilst the engine is hot, cover the cap with a cloth and release it very slowly allowing a gradual escape of pressure (steam) from the system.



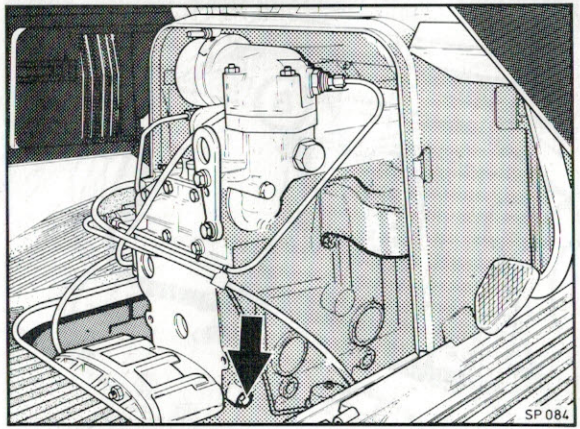
Header tank

Radiator External Cleaning

In very dusty conditions or where insects are numerous the radiator (core) should be kept clear by periodic blowing with compressed air from the engine side.

Draining the Cooling System

1. Set the heater control to 'Hot' and remove the header tank cap.
2. Remove the cylinder block drain plug and disconnect the bottom radiator hose at the radiator. Allow to drain.



Cooling water drain plug – diesels

Flushing the Cooling System

It is recommended that the cooling system be flushed out every 2 years to remove any sediment or sludge which may affect the efficiency of the system. The best time to do this is when refilling the system with anti-freeze.

1. Drain the system as described previously.
2. Insert a cold water supply hose in the header tank filler neck, and regulate the flow of water so that overflow does not occur. Flush the system until clean water is seen to flow from the bottom hose and cylinder block.
3. Refill the system.

To Refill

1. Set the heater control to 'Hot'.
2. Refit the bottom hose and replace the cylinder block drain plug.
3. Refill the system with clean (soft where possible) water and the necessary proportion of anti-freeze.
4. Run the engine for a short time to disperse any air locks and check for leakage.
5. Re-check coolant level and top up as necessary.
6. Refit the engine under-tray if previously removed.

Protecting the system throughout the year

This vehicle is supplied with a cooling fluid which contains a proportion of 30% by volume of antifreeze. This fluid ensures protection of the cooling system (anticorrosion, scale inhibition, etc.). The proportion of 30% gives frost protection in temperatures down to −12°C.

For temperatures below this, it is essential to adopt the correct concentration for the protection required.

Above 55%, protection against cold and cooling efficiency are reduced.
Therefore, never exceed this value.

Note

The protective mixture can remain in the system for 2 years, but the concentration must be closely monitored during the winter months.

In all countries, whatever the climate or the season, never allow the concentration to drop below 30% in order to ensure adequate anti-corrosion protection of the system.

DIESEL ENGINES

Smoke Emission

To ensure that your vehicle complies with the smoke emission regulations the following points must be observed:

1 NEVER attempt to alter the diesel fuel injection pump and governor settings. This work is for the specialist and must only be entrusted to him.
2 NEVER use substitute equipment for the fuel, air or exhaust systems. Only parts to the original specifications may be used.
3 ALWAYS ensure that the fuel, air and exhaust systems are correctly maintained.

Remember, it is an offence for vehicles to give off excessive smoke.

Fuel Tank - Draining Sediment

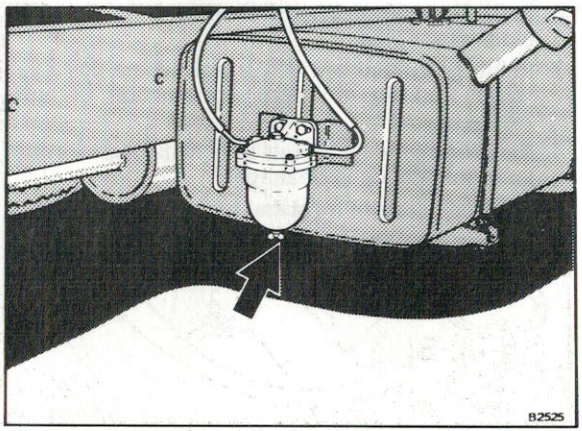
At the recommended intervals the fuel tank should be drained of any sediment. The fuel tank drain plug is located at the base of the fuel tank.

Place a suitable container beneath the drain plug. Remove the plug and allow about half a pint of fuel to drain off before replacing the plug.

Water and Dirt Trap

The water and dirt should be drained from the bowl at the periods shown in the service schedule, unless fuel or operating conditions require more frequent attention.

1 Drain the contents of the bowl into a suitable container.
2 Remove four setscrews securing the bowl clamp ring to the head casting, and remove clamp ring and plastic bowl.
3 Thoroughly clean bowl and deflector plate.
4 Check the sealing ring in the head casting, renew if necessary.
5 Fit the deflector plate in the bowl and fill with clean fuel prior to refitting and ensure an airtight joint is obtained.
6 Vent the fuel system.



Water and dirt trap

Fuel Lift Pump

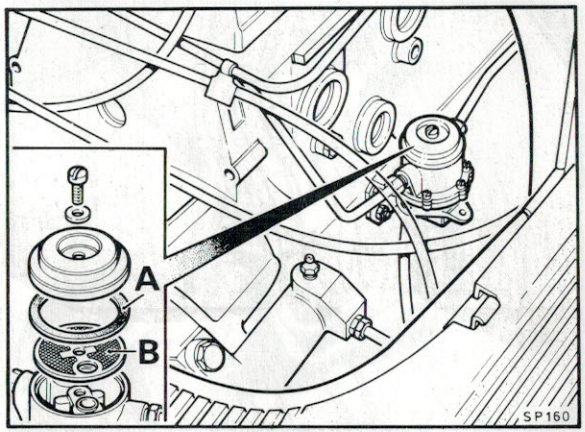
The fuel lift pump is located on the right hand side of the engine below the exhaust manifold.

To clean the gauze filter (B) release the setscrew on the domed cover and remove the cover. The gauze filter can then be lifted out and wiped clean using a lintless cloth.

Clean out the sediment chamber ensuring dirt does not enter the interior of the pump.

Ensure that the gasket (A) is in good condition and renew if necessary. Also ensure that an airtight joint is made between the domed cover and pump body.

Vent the system of air.



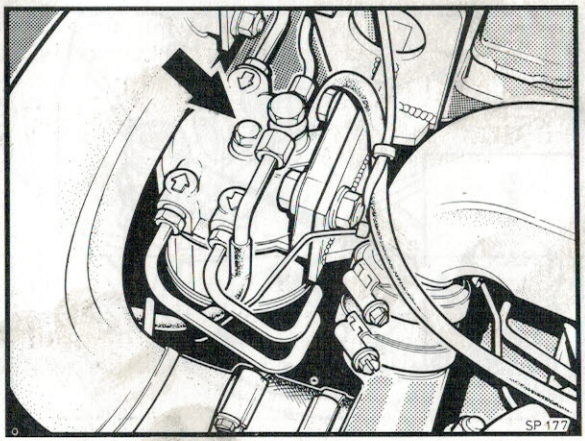
Fuel lift pump

Final Fuel Filter Element – To Renew

The filter is located to the rear of the engine. Access to the unit is made by removing the rear engine cover.

The element cannot be cleaned but should be renewed at the recommended periods.

1 Place a protective cover over the starter motor to protect it from any spilt fuel.
2 Clean the exterior of the fuel filter assembly.
3 Unscrew the centre bolt securing the filter bowl to the top cover.
4 Drop the filter bowl clear and discard the filter element.
CAUTION. Do not allow fuel to drip on to sound insulation material.
5 Clean the bowl with paraffin or fuel oil.
6 Renew the 'O' ring located in the filter head and the upper and lower sealing rings.
7 Place the bowl on the base of the new filter element and offer up the assembly squarely to the filter head so that the top rim of the element is centrally located against the sealing ring in the filter head.
8 Hold the assembly in this position and locate and tighten the securing bolt.
9 Prime the fuel system as described in this section.
10 Remove the protective cover from the starter motor.



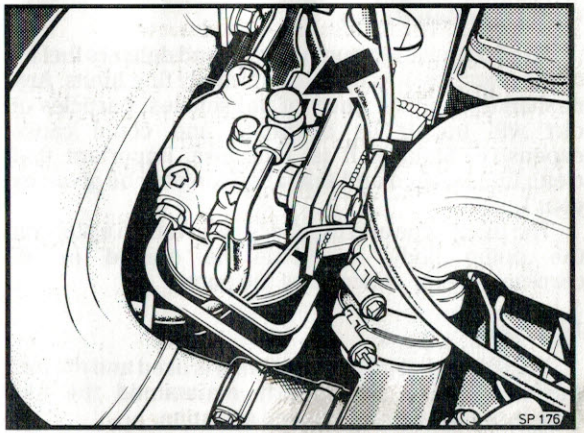
Fuel filter retaining bolt

To Vent the Fuel System

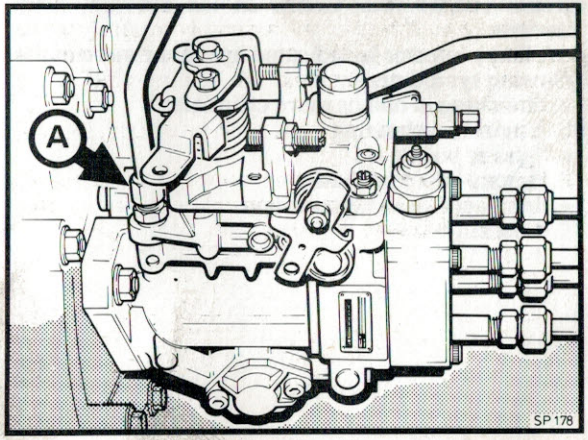
1 Although the fuel filter is self venting through a 0.5 mm diameter hole, it will be quicker to fill an empty filter by operating the fuel lift pump priming lever after first loosening the fuel return banjo bolt. When fuel free from air bubbles appears around the banjo, retighten bolt.
NOTE. It may be necessary to turn engine until priming lever is at the bottom of its stroke to obtain full movement.
2 Set throttle to fully open position. Engine stop solenoid must be fully energised by turning starter key to position **"II"**.
3 Loosen the pipe union nut (A) at the fuel injection pump inlet. Operate priming lever until fuel free from air bubbles appears around threads, then retighten union nut.
4 Loosen any two high pressure pipe unions at the injector end.
5 Operate starter motor until fuel free from air bubbles issues from both pipes. Retighten both pipe unions.
6 Start the engine. If the engine stops after a short running period, there may still be some air in the system. Reprime the complete system.

WARNING

When carrying out this procedure great care must be taken to prevent fuel under pressure from contacting the skin since it will penetrate with ease.



Fuel Return Banjo Connection



Fuel Injection Pump

Fuel Injection Pump

The fuel injection pump meters and delivers fuel oil to the injectors. It is built to extremely fine limits. Any mishandling or the entry of the smallest particles of dirt will impair its operation and could cause expensive damage. It is, therefore, important that clean fuel be used and that attention only be given by your Dealer.

The pump type and number – as given on a plate on the pump body – should be quoted in all correspondence concerning the pump.

Injectors

Providing that good-quality fuel is used and the fuel filtration system is properly maintained the fuel injectors will require minimal attention.

Cleaning and testing of injectors must only be carried out by your Dealer at the recommended intervals.

A faulty injector is indicated by one or more of the following symptoms:–

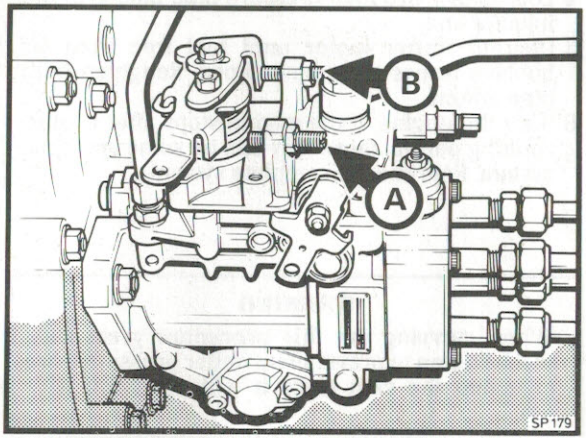
a. Knocking in one or more cylinders
b. Engine overheating
c. Loss of power
d. Smoky (black) exhaust
e. Increased fuel consumption
f. Misfiring.

Engine Speed Adjustment

The adjustment screw on original fuel pumps is set and sealed by the manufacturer. The setting must not be interfered with as this could affect the engine warranty.

If a new pump has been fitted, check the maximum no load speed with the engine at its normal temperature of operation. If necessary, this speed can be adjusted by the outer adjustment screw (A). The maximum no load speed is the last part of the fuel pump setting code stamped on the side of the fuel pump. A typical setting code is as follows: 2643J000/CK/1/2960; in this example the maximum no load speed is 2960 rev/min.

With the engine at the normal temperature of operation check that the idle speed is 625 rev/min. If necessary adjustment can be made by the inner adjustment screw (B).



Engine Speed Adjustment

PETROL ENGINE

General

The fuel and air intake system is designed to ensure that the vehicle meets the current exhaust emission standards. It is therefore important that should it be necessary to renew any parts, only parts which conform to the original specification may be fitted.

It must also be stressed that any adjustments or settings made do not result in excessive CO emission and they should therefore be carried out by your Dealer who has the necessary emission analysing equipment.

NOTE. When fuel pipe clips are removed always ensure that they are refitted securely when the service operation is completed.

CRANKCASE VENTILATION

This system ensures that engine fumes and vapours from the crankcase are recirculated into the air intake system and therefore cannot pollute the atmosphere.

It is essential that servicing of the ventilation system be carried out as specified in the Service Schedule.

Failure to maintain these items can result in sludging of the oil and erractic slow running of the engine.

Fuel Lift Pump

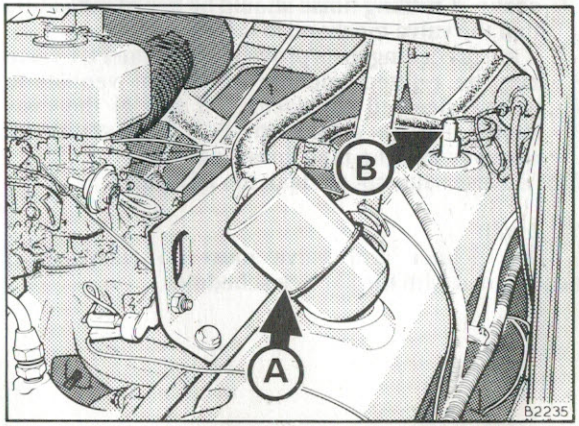
The pump is located on the right hand side of the engine.

The pump is a sealed unit and no servicing is necessary except for an occasional check for security to the cylinder block and for signs of any fuel leakage.

Crankcase Inlet Air Cleaner

To Clean

1 Disconnect the hoses at the inlet air cleaner (A).
2 Pull the cleaner from the rocker cover.
3 Wash the cleaner thoroughly in paraffin and allow to dry.
4 Fill the cleaner with clean engine oil and lay it so that the oil drains off through the vent outlet at the top.
5 Push the cleaner into the rocker cover and reconnect the hoses.



Crankcase inlet air cleaner and PVC valve

PCV Valve

To Test

Operation of the PCV valve should be checked as follows:–

1 With the engine idling pull the PCV valve (B) from the rocker cover. A hissing noise should be heard as air passes through the valve and a strong suction felt when a finger is placed over the valve inlet.
2 Replace the PCV valve in the rocker cover.
3 Remove the crankcase inlet filter and hold a piece of stiff paper or thin card over the hole. Allow about a minute for crankcase pressure to drop and the paper should be sucked against the hole with noticeable force.
4 Replace the crankcase cleaner.
5 Switch off the engine.
6 Remove the PCV valve from the rocker cover and shake. A rattling noise should be heard indicating that the valve mechanism is free.
7 If the preceding tests prove positive the PCV valve may be refitted and the crankcase ventilation system deemed satisfactory. If any of the tests should indicate a fault, the PCV valve should be renewed and the pipe lines cleaned.

NOTE. Never attempt to clean the PCV valve.

To Renew

The cleaner and valve must be renewed in accordance with the service schedules.

In Line – Fuel Filter

A renewable paper element type filter is mounted adjacent to the fuel tank and in the fuel line between tank and lift pump.

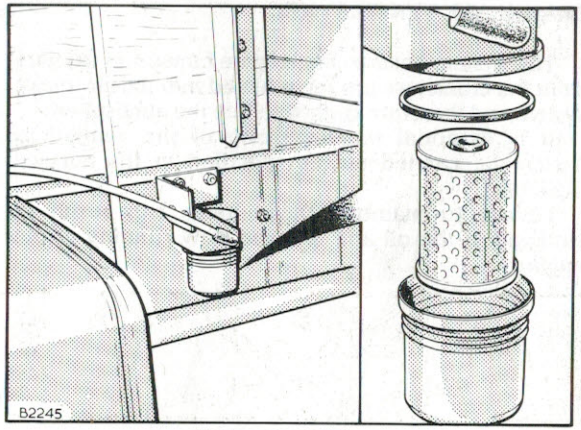
Caution. To prevent the siphoning effect which can occur with a full tank, disconnect the feed line at the tank unit.

To renew the element, unscrew the bottom container and pull the old element from the stub leading away from the upper chamber.

Remove the large sealing ring from the filter body and clean the container thoroughly.

Fit a new element engaging the 'O' ring seal over the upper chamber stub. Fit a new sealing ring and replace the container.

Filters should be renewed at the periods stated in the service schedules.



Inline Fuel Filter

Carburettor

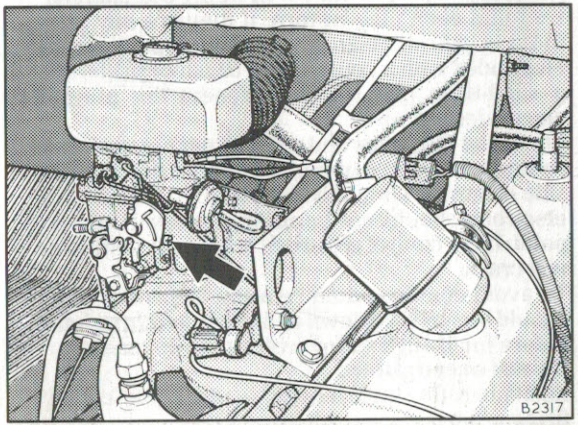
Caution Carburettors are designed to comply with current legislative requirements in respect of emission standards. It is very important that any adjustments which can affect these emissions are left to your Dealer.

Any replacement parts which might be necessary must be identical in specification to those fitted as original equipment.

Idling Adjustment

Minor adjustments may be made only at the idling screw in order to maintain the recommended idling speed as quoted in 'Specifications'.

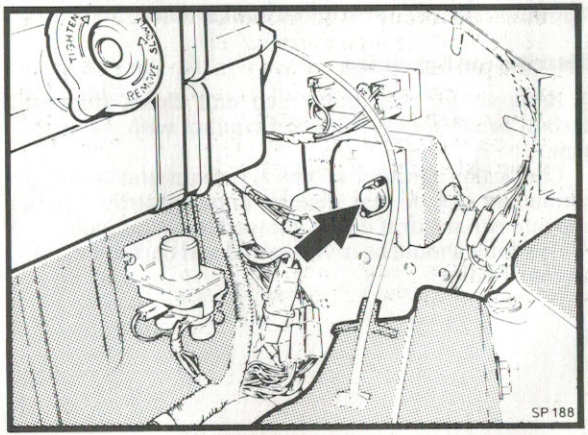
With the engine at its normal operating temperature, turn the idling screw clockwise to increase engine speed.



Idling Screw

WARNING

1 The ignition high tension circuit – between the coil and spark plugs, and the control unit – operates at very high voltage which can be dangerous, particularly to people with heart complaints or with 'pacemakers'. Do not handle these leads when the engine is running.
2 The control unit of the electronic ignition is mounted on the L.H.S. of the engine compartment beneath the bonnet. The circular protrusion on the top of the control unit is a power transistor that carries very high voltage. Take care not to touch the transistor when the engine is running.



Control unit electronic ignition

ELECTRONIC IGNITION SYSTEM

Description

The petrol engine is equipped with an electronic ignition system, the usual 'contact breaker' being replaced by an electromagnetic pick-up that requires no periodic adjustments or servicing. The position of the pick-up in relation to the moving parts of the distributor is very critical and the setting requires specialist knowledge and equipment. You are advised not to interfere with the distributor beyond the attention detailed under "Distributor Servicing" and to allow only an authorised Dealer to carry out any additional work.

The ignition coil, high tension leads, distributor and sparking plugs fitted conform to ignition suppression regulations. When replacements are necessary they must have identical performance characteristics to the original equipment.

Distributor Servicing

Remove the distributor cap and check that the carbon brush is making good contact with the rotor arm.

Check that ignition cables are clean and securely connected but do not disturb unnecessarily. Spark leakage can occur if dirt is allowed to accumulate.

Any fault should be investigated and corrected only by your Dealer.

Sparking Plugs

The sparking plugs should be removed, cleaned and adjusted at the recommended intervals. The correct gap setting and plug type will be found under "Specifications".

CAUTION

The plugs have a taper seat which provides a gas tight seal; therefore no gasket is necessary.
The plugs are 5/8 inches across flats and should be removed using a thin walled deep set socket, 3/8 in. square drive and a universal joint.

To Remove and Clean

1 Disconnect the high tension leads. Do not pull on the leads to disconnect them from the plugs.
2 Clean the plug recesses in the cylinder head.
3 Remove the plugs with a well-fitting box spanner.
4 Examine each plug in turn. If they are oily wash them in petrol. Clean any carbon deposit on the electrodes with a copper wire brush or preferably a sand-blast type cleaner. Renew the plugs if electrodes are worn.
5 Check the plug gaps and adjust if necessary. When setting the gap it is important to note that only the side electrode should be bent and that the central electrode should not be used as a lever fulcrum point. If the central electrode is bent the insulation will crack.
6 To avoid damage when refitting, the spark plugs should be screwed down as far as possible by hand before finally tightening with a plug spanner. **Do not overtighten.**
7 Reconnect the high tension leads in the correct firing order.

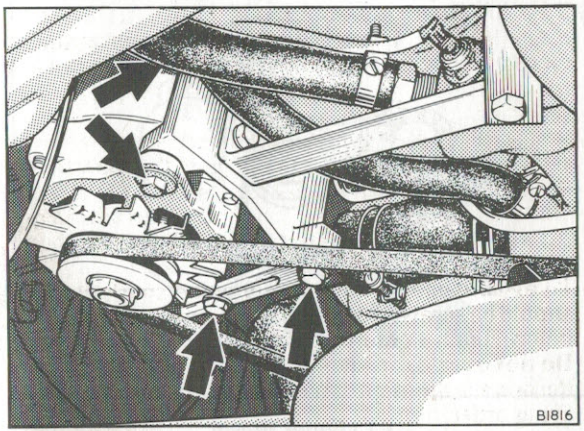
DRIVE BELTS – ADJUSTMENTS

The belt should never be allowed to become loose enough to slip as this can cause overheating and undercharging, nor should it be overtightened as this may be the cause of overload on the alternator or water pump bearings.

To Check

To check belt tension apply a light pressure to the belt at a point midway along the longest unsupported length and measure the deflection. This should be as follows:–

6 Cylinder petrol engine – 12mm (½in)
4 Cylinder diesel engine – 9mm (⅜in)



Alternator fastenings – 6 cyl. petrol

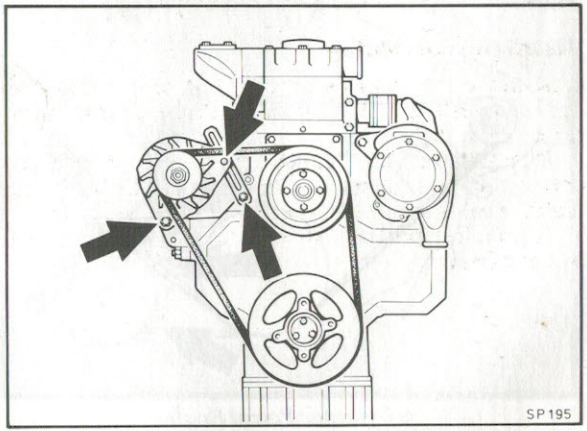
To Adjust – Fan Belt

Belt tension is adjusted by altering the position of the alternator.

Loosen the nuts and bolts securing the alternator to its mounting bracket and adjusting strap and the setscrew securing the strap at the cylinder block.

Move the alternator to give the correct tension, tighten all fixings and recheck the tension.

NOTE. When fitting a new belt, the adjustment should be rechecked after a short period of running to allow for initial stretch and bedding in.



Belt adjustment – diesels

Belt Adjustment (Power Steering)

6 Cylinder Petrol Engine

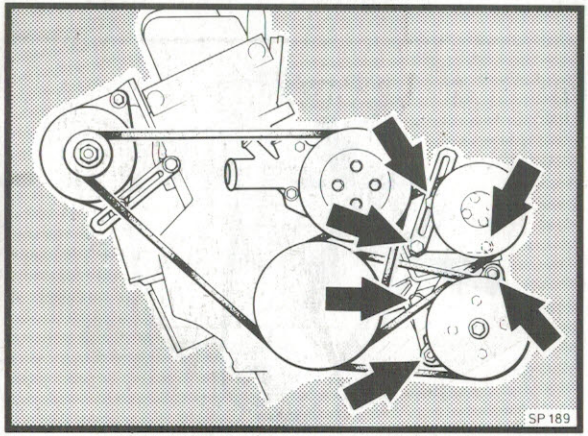
Remove the front section of the engine undertray. From below, slacken off the pump pivot bolt. From above slacken the strap pivot and slide bolt. Pivot the pump away from the engine until the correct belt tension is obtained and holding it in this position tighten slide bolt followed by two remaining bolts.

4 Cylinder Engines

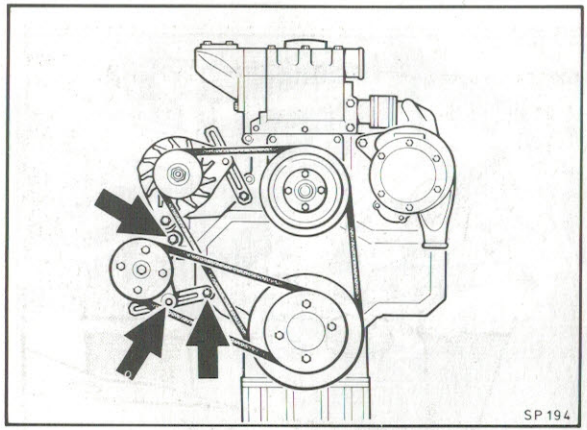
Remove the front section of the engine undertray.

From below slacken off strap pivot and slide bolt. From above slacken the pump pivot bolt.

Swing the unit outwards away from the engine until correct belt tension is obtained. Holding it in this position retighten slide bolt followed by remaining two bolts.



6 Cylinder Petrol Engine
Power Steering and Vacuum Pumps



4 Cylinder Diesel

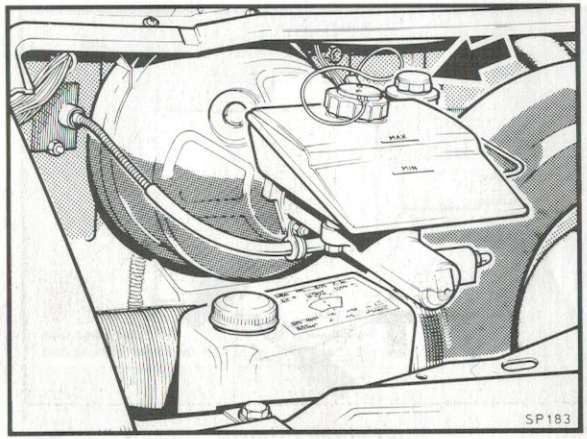
HYDRAULIC CLUTCH

Hydraulic System

The hydraulic fluid reservoir is located beneath the bonnet near the brake fluid reservoir.

Check the level of the fluid at regular intervals and if necessary top-up to within 12 mm (½ inch) from the filler aperture. Do not overfill otherwise clutch slip could occur when the fluid expands in hot weather. Check that the breather hole in the top edge of the filler cap is clear.

Topping-up should only be necesary at long intervals. Regular topping up or a sudden fall in fluid could indicate a leak in the system and this should be traced and rectified immediately by an authorised Dealer.

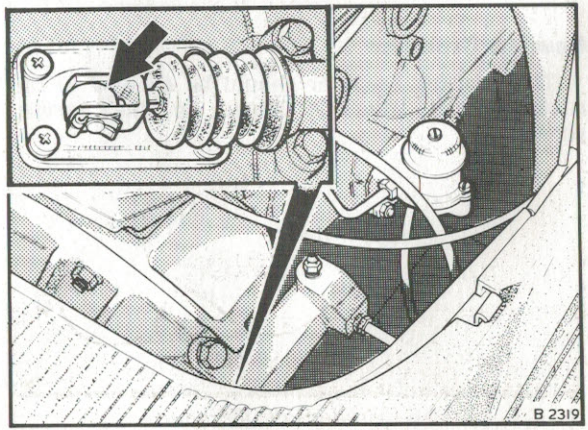


Clutch Master Cylinder

The clutch withdrawal mechanism is self adjusting and therefore requires no attention apart from lubrication at the withdrawal lever.

Fluid and Seal Changes

This is not a normal routine maintenance operation and must therefore be specifically requested when the vehicle is taken to the Dealer for service.



Clutch Slave Cylinder

GEARBOX

General

Examine the gearbox for leaks and rectify if possible by tightening bolts. If leakage persists take the vehicle to your Dealer for attention.

Checking the Oil Level

Check the gearbox oil level regularly and top-up if necessary. A combined oil level and filler plug on the left hand side of the gearbox is accessible from beneath the vehicle.

Check the oil level after the vehicle has been standing for some time and if possible ensure that the vehicle is standing on level ground. Top-up until oil reaches the filler plug aperture.

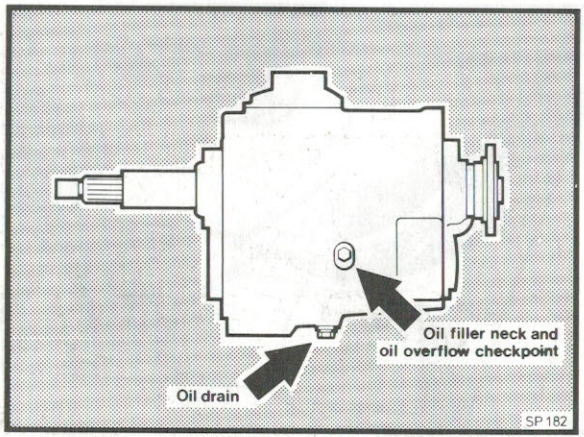
Gearbox Breather

The gearbox breather should be cleaned at the recommended intervals stated in the service schedule.

Changing the Oil

The oil must be changed at the intervals stated in the service schedule. See "Recommended Lubricants" for type of oil.

If possible change the oil when the vehicle has returned from a run and the oil is still warm. The drain plug which is magnetic will be found located in the bottom face of the unit. Ensure the plug is cleaned, refitted and tightened securely when draining is completed.



HYDRAULIC CLUTCH

Hydraulic System

The hydraulic fluid reservoir is located beneath the bonnet near the brake fluid reservoir.

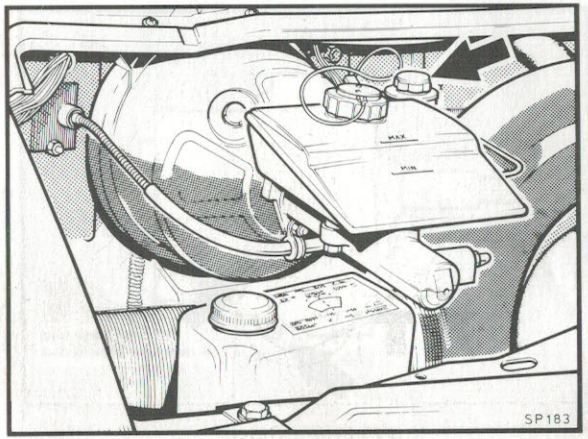
Check the level of the fluid at regular intervals and if necessary top-up to within 12 mm (½ inch) from the filler aperture. Do not overfill otherwise clutch slip could occur when the fluid expands in hot weather. Check that the breather hole in the top edge of the filler cap is clear.

Topping-up should only be necesary at long intervals. Regular topping up or a sudden fall in fluid could indicate a leak in the system and this should be traced and rectified immediately by an authorised Dealer.

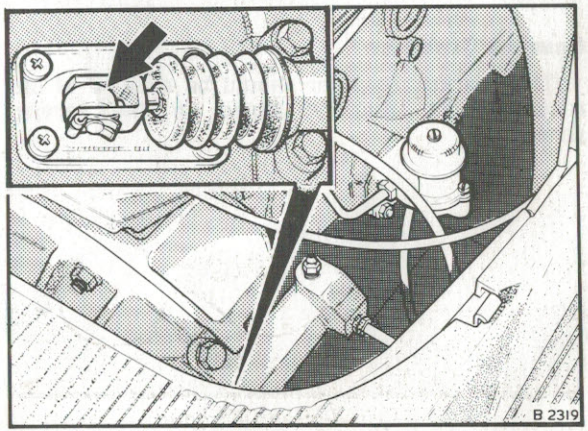
The clutch withdrawal mechanism is self adjusting and therefore requires no attention apart from lubrication at the withdrawal lever.

Fluid and Seal Changes

This is not a normal routine maintenance operation and must therefore be specifically requested when the vehicle is taken to the Dealer for service.



Clutch Master Cylinder



Clutch Slave Cylinder

GEARBOX

General

Examine the gearbox for leaks and rectify if possible by tightening bolts. If leakage persists take the vehicle to your Dealer for attention.

Checking the Oil Level

Check the gearbox oil level regularly and top-up if necessary. A combined oil level and filler plug on the left hand side of the gearbox is accessible from beneath the vehicle.

Check the oil level after the vehicle has been standing for some time and if possible ensure that the vehicle is standing on level ground. Top-up until oil reaches the filler plug aperture.

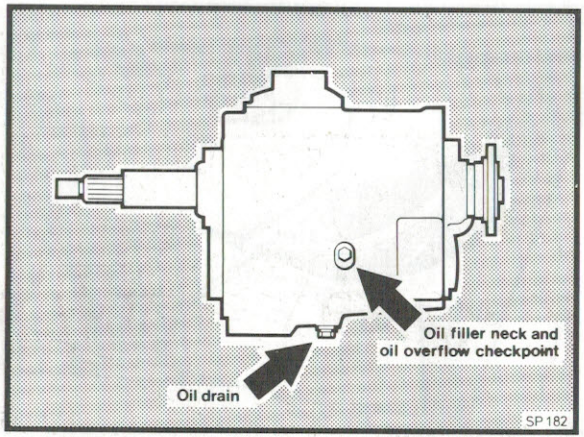
Gearbox Breather

The gearbox breather should be cleaned at the recommended intervals stated in the service schedule.

Changing the Oil

The oil must be changed at the intervals stated in the service schedule. See "Recommended Lubricants" for type of oil.

If possible change the oil when the vehicle has returned from a run and the oil is still warm. The drain plug which is magnetic will be found located in the bottom face of the unit. Ensure the plug is cleaned, refitted and tightened securely when draining is completed.

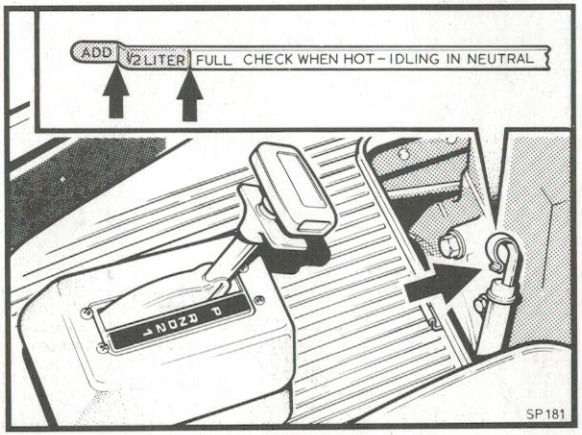


AUTOMATIC TRANSMISSION

Checking Fluid Level

The level of the transmission fluid must be checked at the recommended intervals and if necessary topped-up as follows:–

1 Remove the rear engine cover inside the cab.
2 Before removing the dipstick, wipe all dirt off the protective cap and top of the filler tube.
3 With the selector lever in "N" (neutral), engine running at idle speed and the fluid at normal operating temperature, approximately 79.4°C (175°F), the fluid level is correct if it is between the "Add ½ litre" and "Full" marks on the dipstick.
4 Refit the dipstick and rear engine cover.



Dip Stick – Auto. Transmission

Changing Transmission Fluid and Filter

These operations should be carried out at the intervals specified in the service schedule. However, since draining and filter replacement necessitates removal of the sump, it is recommended that this work be entrusted to your Dealer.

CAUTION. Removing the sump from the transmission will expose the valve block. It is imperative that absolute cleanliness is observed since the ingress of the smallest piece of dirt or grit could seriously impair its operation.

Band Adjustment

This operation should be carried out when the fluid and filter changes are carried out. Adjustment of the bands is critical to the correct function of the unit and should therefore be left to your Dealer.

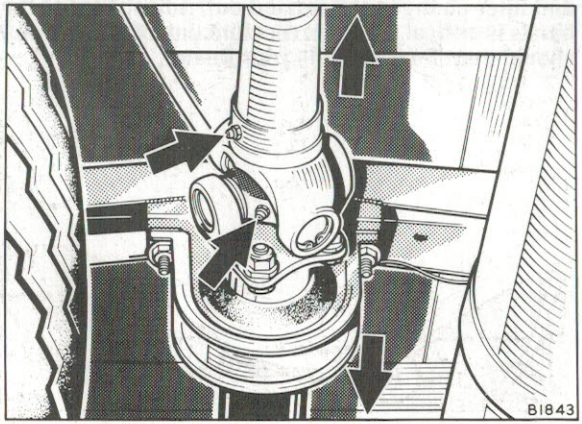
PROPELLER SHAFT

Lubrication

Lubrication nipples are incorporated in the universal joints and sliding sleeves. Apply grease of the correct grade at the recommended intervals.

The centre bearings are packed with grease on assembly and require no further attention.

Check the tightness of coupling flange nuts.



REAR AXLE

General

The level of the oil in the rear axle must be checked regularly and topped up if necessary. In addition the oil must be changed completely at the intervals stated in the service schedule.

Check the unit for leaks and rectify if evident by tightening appropriate nuts or bolts. A persistent leak or a leak from the front of the differential housing should be dealt with by your Dealer.

Checking Oil Level

A combined oil filler and level plug will be found located in the rear cover.

With the vehicle standing on level ground clean the area around the filler plug (A) remove the plug and top up with oil of the correct grade until level with the plug orifice. Do not overfill. Replace the filler plug.

To Drain and Refill

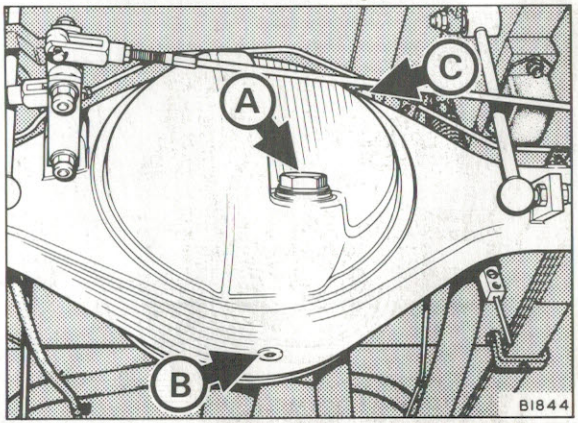
The rear axle oil should be renewed at the recommended intervals.

Draining the oil is best done when the axle is warm and the lubricant flows more easily.

1 Wipe the area around the drain plug (B) – and remove the drain plug.
2 Allow the oil to drain completely.
3 Replace the drain plug.
4 Wipe the area around the filler plug and remove the plug. Fill with the correct grade of oil until level with the filler plug orifice. Do not overfill.
5 Replace the plug.

Breather

A breather (C) located in the top of the rear axle differential casing must be removed and cleaned at the intervals stated in the service schedules.



WHEEL HUBS

Hub Bearing End Float

The hub bearing end float should be checked by your Dealer at the recommended intervals.

Hub Bearing Lubrication

The hub bearings should be cleaned and repacked with fresh lubricant by your Dealer at the recommended intervals.

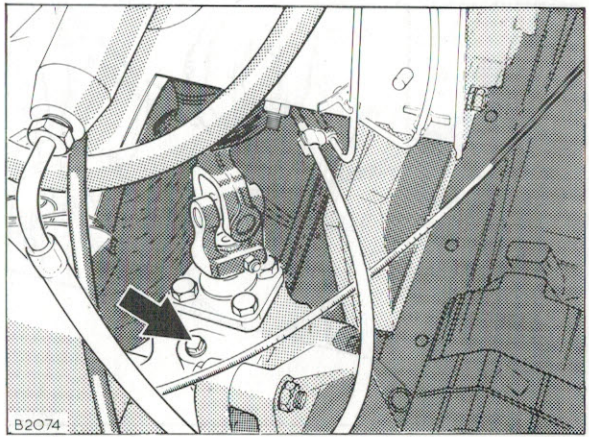
MANUAL STEERING

Steering Free Play

Excessive free movement at the steering wheel is not permitted and this should therefore be checked regularly. If evident, take the vehicle to your dealer for rectification.

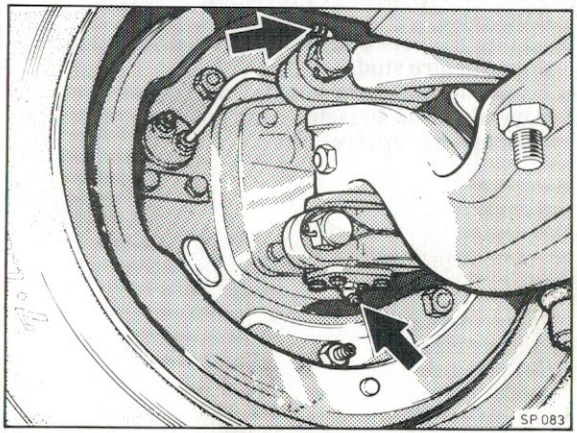
Steering Box Oil Level

The oil level must be checked at recommended intervals by removing the combined filler/level plug located in the top of the steering box at the front. If necessary, top up with the correct grade of oil until the level reaches the filler plug hole. Refit the plug securely.



Swivel Pin Lubrication

Swivel pin lubricators are located at the top and bottom of the swivel pins. Apply grease of the correct grade at the recommended intervals.



POWER STEERING RESERVOIR

Checking the Fluid Level

The reservoir which is located under the bonnet has a dipstick fitted to the filler cap. Before removing the cap clean the outside thoroughly. If necessary top-up the reservoir to the level mark on the dipstick.

Reservoir Filter

The filter which is located within the reservoir unit must be renewed at the recommended intervals.

Proceed as follows:–

1 Thoroughly clean the outside of the reservoir.
2 Remove the centre stud nut and lift off the cover.
3 Remove the spring and spring seat and lift out the element.
4 Examine the cover and filler cap seals and renew if necessary.
5 Fit new element and locate spring seat and spring on the centre stud.
6 Fit and secure cover – do not overtighten.
7 With wheels in straight ahead position check fluid level and top-up if required.

Draining Steering Fluid

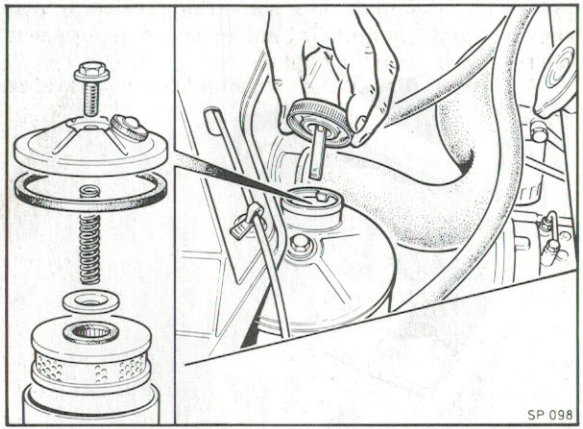
If for any reason it becomes necessary to drain the system, proceed as follows:–

To Drain

Apply the parking brake; jack-up and support the front axle.

Remove the reservoir cover (for filter renewal).

Place a suitable container beneath the steering box and disconnect the two pipes from the unit.



Note The fluid will run out of the box onto the front spring assembly. It is therefore advisable to use a tray type container.

Operate the steering from lock to lock several times until fluid ceases to flow.

Immobilise ignition (petrol) or fuel system (diesel) and turn the engine over on the starter (using short applications) to drain the fluid which is trapped within the power steering pump.

When fluid ceases to flow reconnect pipe unions.

To Refill and Bleed

Having fitted a new element in the reservoir refill with fresh fluid until the element is just covered. Start the engine and allow it to idle. As soon as the fluid in the reservoir starts to drop, top-up to maintain the level.

Bleed the system by turning the steering from lock to lock topping-up as necessary. Continue until level remains constant and air bubbles cease to appear in the reservoir. Stop the engine.

Refit reservoir cover and top-up to correct level on dipstick.

SUSPENSION

Leaf Springs

Normally these require only periodic cleaning to allow visual checks in respect of spring condition e.g. cracks or breaks. Any repairs or replacements should be entrusted to your Dealer.

Dampers – Telescopic type

Telescopic type dampers require no attention except for periodic checks for leakage.

BRAKE SYSTEMS

General

The foot brake system is hydraulically operated with vacuum or air assistance to front and rear brake assemblies.

On vacuum hydraulic models the handbrake is cable operated and acts on the rear wheels only. On air hydraulic models, parking is by means of a spring brake unit which operates when air is released from the cylinder. Adjusment of brake shoe or pad clearance is made by foot brake application on the front brakes and by foot or handbrake application on the rears.

WARNING

It is important that the brake system be maintained to a high degree of efficiency at all times.

The following notes should be observed:–

1 Regularly check all visible parts of the system for signs of leaks. Rectify as necessary immediately.
2 Ensure that the brake fluid reservoir is kept topped up to its correct level.
3 Inspect all pipelines, brake hoses and external rubber boots for signs of wear, damage and deterioration. Rectify as required.
4 Examine brake shoes and pads for wear at regular intervals as indicated in the service schedule.
5 Renew the hydraulic fluid and seals as recommended in the Planned Maintenance Schedule.

A load sensing valve is incorporated which regulates the braking effort applied at the rear wheels relative to the load on the rear axle.

The system also incorporates warning lights for handbrake 'on', hydraulic brake fluid low level and low vacuum/air. (See "Brake Warning Light and Buzzer").

AIR SYSTEM

Compressed air is supplied through a dual brake pedal valve to a tandem actuator which in turn operates a tandem hydraulic master cylinder. The air system is split, and each section is supplied with air by separate service reservoirs. Each reservoir is fed by the sensing reservoir through a quadruple protection valve. The hydraulic circuit is also split, the separate chambers of the master cylinder each operating the brake units on one axle. In this system failure of one part of the air system allows reduced but effective braking on both axles, whilst a failure of one part of the hydraulic system provides full braking on one axle.

The secondary brake is considered to be the unfailed part of the system.

The hand control valve on this system provides park braking. Air exhausted from a single spring brake unit on the rear axle releases a powerful spring to operate the rear brake units mechanically through a compensator linkage.

VACUUM SYSTEM

Vacuum supply is provided by an exhauster unit.

All hose connections should periodically be checked for leaks and general deterioration. Tighten joints where required and have any apparent loss of vacuum rectified by an authorised Dealer.

Decarbonising the Compressor

The compressor should be checked for carbon build up, and decarbonised if necessary, at the recommended intervals by your Renault Dealer.

Sensing Reservoir

Safety Valve

A safety valve (C) is fitted to the sensing reservoir to prevent excessive pressure build-up due to non-functioning of the governor valve cut out.

Automatic Drain Valve

An automatic drain valve (A) is fitted to the air sensing tank and condensate is ejected automatically. At the recommended intervals press the plunger to empty the air tank. Remove drain valve assembly and clean the filter with diesel fuel. Dry the filter before re-assembly.

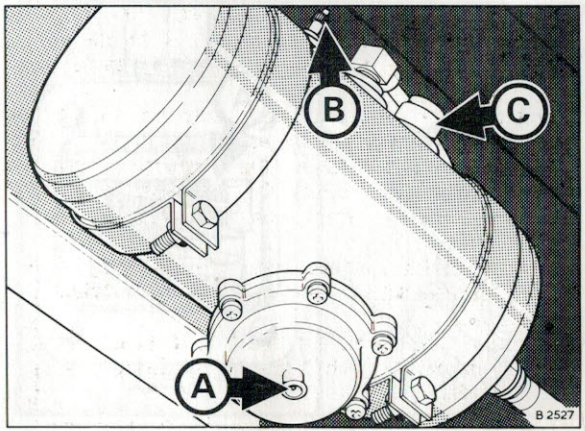
Emergency Charging of Air System

In the event of air pressure being lost by failure of the air charging system it is possible to charge the system from an external source.

External charging is accomplished by connecting a compressed air source to a Schrader-type valve (B) located on the sensing reservoir.

IMPORTANT. External charging must only be used to assist removal of the vehicle for subsequent repair.

It is not possible to release the parking brake without full air pressure except by winding off. See "Spring Brake Unit".



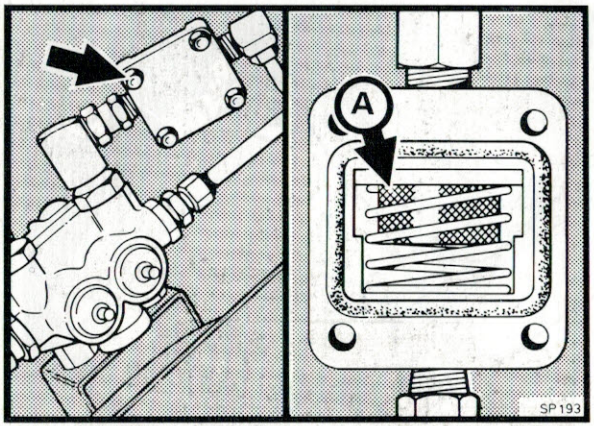
Sensing reservoir

Air Line Filters

Three air line filters are fitted in the air system.

One in line filter (A) is fitted adjacent to the quadruple protection valve, and one in each inlet port of the foot valve.

At the recommended intervals the in line filter should be removed and cleaned.



Spring Brake Unit

WARNING

Under no circumstances should this unit be touched except by experienced personnel with special equipment. The compression of the spring is very high and, if released without proper equipment, can inflict serious injury.

The parking brake is operated by a spring unit located in a chamber on the rear axle.

A 'wind-off' is incorporated in the actuator to release the rear brakes if it is required to move the vehicle when a fault in the air system or hand control valve will not release the brakes in the normal way. A special spanner is provided with each vehicle.

WARNING

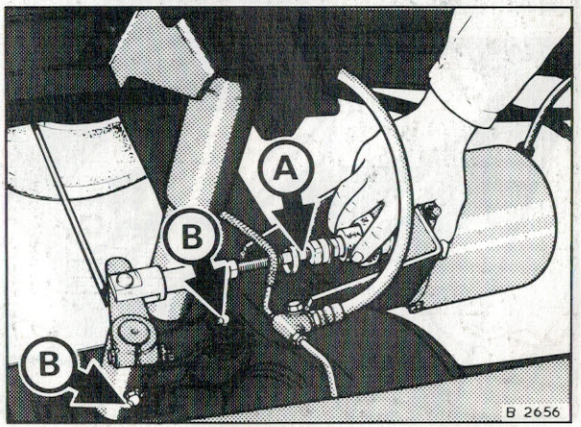
The vehicle must not be driven on public roads with the mechanism wound back. Any attempt to drive it would be illegal and dangerous.

To Wind-off

1 Chock the wheels, couple the vehicle to the towing unit with a rigid tow bar, and apply the parking brake on the towing unit.
2 Roll back the gaiter from the pull rod and mark the position of the locknut relative to the pull rod. Slacken the locknut and rotate the pull rod sleeve (A) clockwise, ensuring the pull rod does not turn in the fork end. Initial movement will relax the power spring, then the pull rod will lengthen to release the rear brakes.
3 The wind-off mechanism must be reset to the original condition by reversing the procedure when the appropriate repairs have been completed.

Lubrication

Two lubricators (B) are situated on the handbrake compensator unit located on the rear axle. Lubricate at the recommended intervals.



HYDRAULIC SYSTEM

The hydraulic system operates with two independent circuits, one supplying the front and the other the rear brakes. If a leak develops in one circuit the other is unaffected. Regularly check the hydraulic system for leaks, damage, chafing or corrosion. Have any defects rectified immediately.

Checking Fluid Level

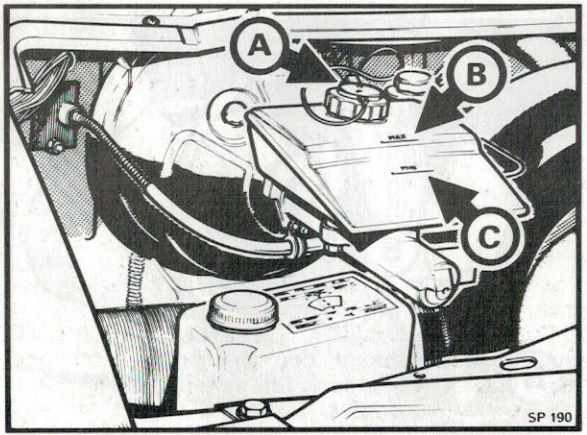
The brake fluid reservoir is located beneath the bonnet on vacuum hydraulic models or behind the cab, on the outside of the chassis sidemember on air hydraulic models. The translucent container allows the level to be seen without removing the cap.

Correct fluid level (B) is indicated on the front face of the reservoir marked 'MAX'. Do not overfill.

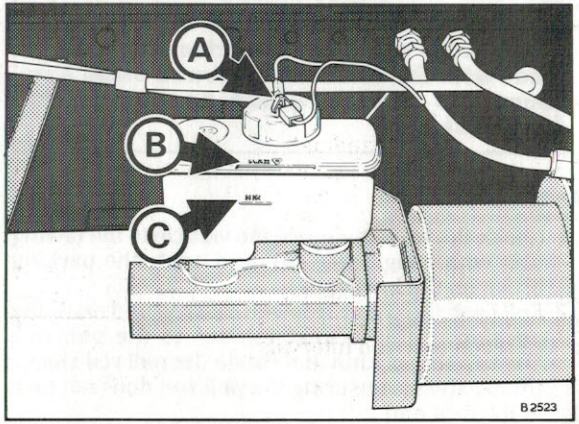
Never allow the fluid level to fall to the 'MIN' mark (C).

Fluid levels should be checked physically at regular intervals. Frequent necessity for topping up indicates a fluid leak which must be rectified immediately.

If topping up is necessary, clean the area surrounding the cap thoroughly before removal. Top up with clean unused fluid to the correct specification, replace the cap.



Vacuum servo unit



Air hydraulic model

To check operation of warning system

To check the low level warning light bulb simply open the cab door. The warning light should illuminate.

To check the operation of the low level warning switch (A) mounted in the cap on the fluid reservoir, proceed as follows:–

1 Ensure that the cab interior lamps are switched to the courtesy position i.e. lamps light only when doors are open.
2 Close both cab doors.
3 Press the filler cap and check that cab interior lamps illuminate.

Bleeding the System

This is not a routine maintenance item and should only be necessary when air has entered the system. Entrust this work to your authorised Dealer if required.

Hydraulic Pipe Connections

Check for leaks and damage of pipe lines, unions, flexible hoses, etc.: if tightening of unions is necessary overtightening must be avoided – THIS WORK SHOULD BE ENTRUSTED TO AN AUTHORISED DEALER.

Due to the use of salt to disperse snow and ice on roads during winter months, it is important that brake pipes are checked (without dismantling) for corrosion at the recommended intervals.

Changing Brake Fluid, Seals and Hoses

In the interest of safety it is recommended that hydraulic fluid, seals and flexible hoses are renewed at the intervals stated in the Service Schedule.

This work must be entrusted to your Dealer.

LOAD SENSING VALVE

The load sensing valve regulates the braking pressure passing to the rear brakes so that maximum pressure is only available when the vehicle is fully laden. As the vehicle's load is reduced the valve automatically lowers the braking pressure.

Accurate setting of the valve is essential and should only be carried out by your Dealer. A brake data plate is located on the vertical panel of the step well showing the valve setting dimension 'Y' for your vehicle. The 'Y' dimension is determined using the unladen weight of the rear axle and is set before delivery to the operator. Any alteration which may change the unladen weight e.g. change of body will necessitate re-setting the valve. A change of rear springs will also require valve re-adjustment. A new brake data plate will have to be fitted showing the new unladen weight and 'Y' dimension.

During the normal life of the vehicle the valve will require re-adjustment due to spring settlement (especially during its early life) at the periods shown in the service schedules.

BRAKE LINING AND PAD WEAR

Disc brakes

Disc brakes are self adjusting.

Brake pad wear can be checked after removing the front wheels as follows:-

S 46, S 56 haulage – Through the front opening in the caliper.

S 56 P.S.V., S 66 – Through the gap (A).

Minimum disc pad thickness all models is 4mm.

S 56 P.S.V., S 66 – The caliper slide pins, rubber boots and bushes (B) should be checked or renewed at the intervals stated in the servicing schedule.

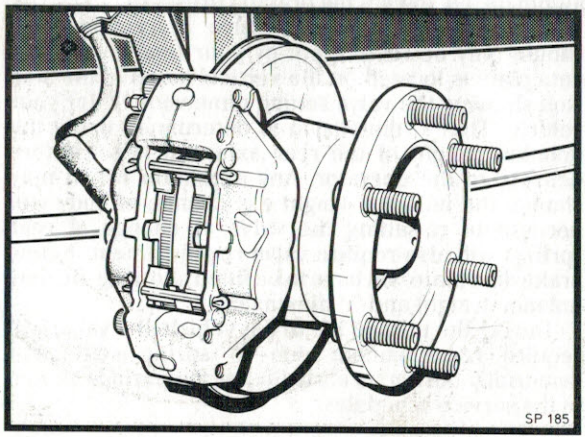
Drum brakes

All drum brakes are self adjusting.

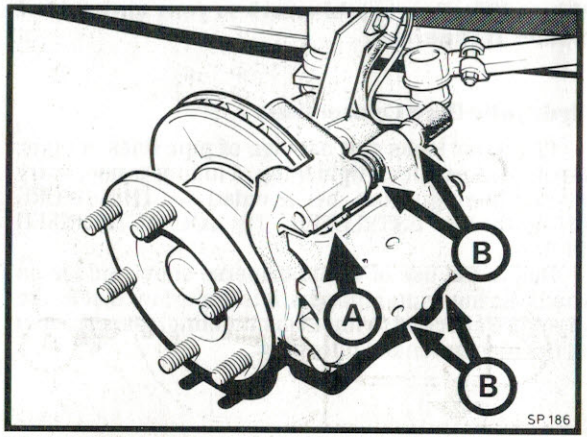
Rear brakes have lining inspection holes (A) protected by covers.

Front brakes (A/H only) do not have lining inspection holes.

Front and rear brakes have slots (B) which give access to manually adjust the brakes.



Front Disc Brake S 46, 56 haulage.

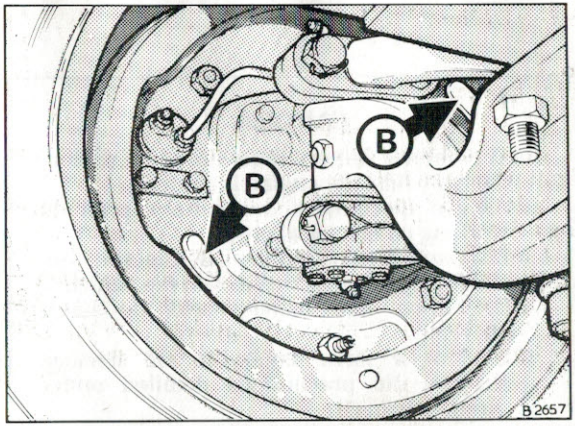


Front Disc Brake S 66, S 56 P.S.V.

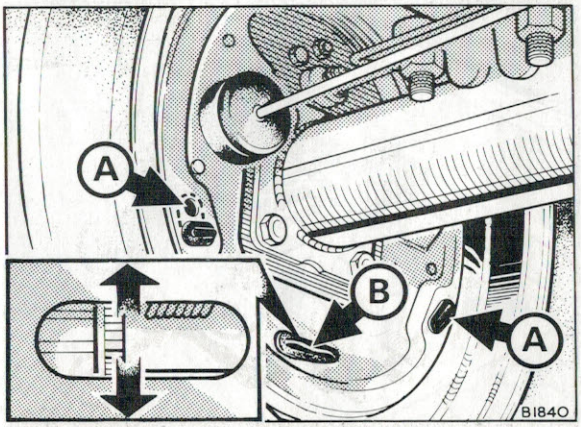
HANDBRAKE

Occasionally lubricate the handbrake pivot, ratchet and pawl assembly. Also lubricate all clevis pins in the cable linkage.

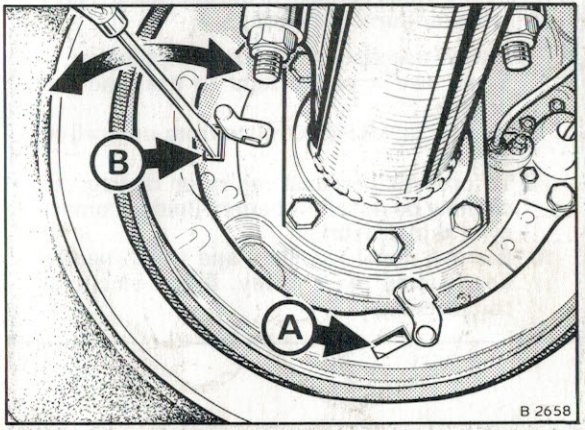
Normal handbrake travel should be 6 to 8 clicks of the ratchet as the lever is applied. Excessive travel indicates stretch in the cable linkage which must be taken up by accurate re-adjustment carried out by your Dealer.



Front Brake – Air hydraulic models



Rear Brake – Vacuum/Hydraulic models



Rear Brake – Air hydraulic models