OWNERS MANUAL

CATERHAM SUPER SEVEN

KEY SERVICE INFORMATION

Tyre Pressures

Wheel Size	Pressure
13" & 14"	20psi (1.4 bar)
15"	18psi (1.3 bar)
16"	16psi (1.2 bar)

Front Tracking 0.5 degrees toe in

Fuel Requirements

Ford OHV and Cosworth BDR	97 octane 4 star
Vauxhall 16v (non - catalyst)	97 octane 4 star
Vauxhall 16v with catalyst	95 octane unleaded
Rover K series (non-catalyst)	97 octane 4 star
Rover (standard) with catalyst	95 octane unleaded
Rover Supersport with catalyst	98 octane super unleaded

All engines other than Cosworth BDR's and Rover Supersports can also run on 95 octane unleaded

Fuel Capacity All models 8 Gallons (36.3 Litres)

Lubrication

APPLICATION	VISCOSITY	VOLUME (L)
Ford engine	SAE 15W/40	3.3
Vauxhall & Rover engine	SAE 5W/50	4.0
Gearbox - 4 speed	EP80 gear oil	0.9
Gearbox - 5 speed	* see below	1.9
Gearbox - 6 speed	* see below	1.9
Differential (De Dion)	EP90 gear oil	0.9
Axle (Marina/Ital)	EP90 gear oil	0.7
Brake Fluid	SA3J 1703f DOT 4	as req'd.

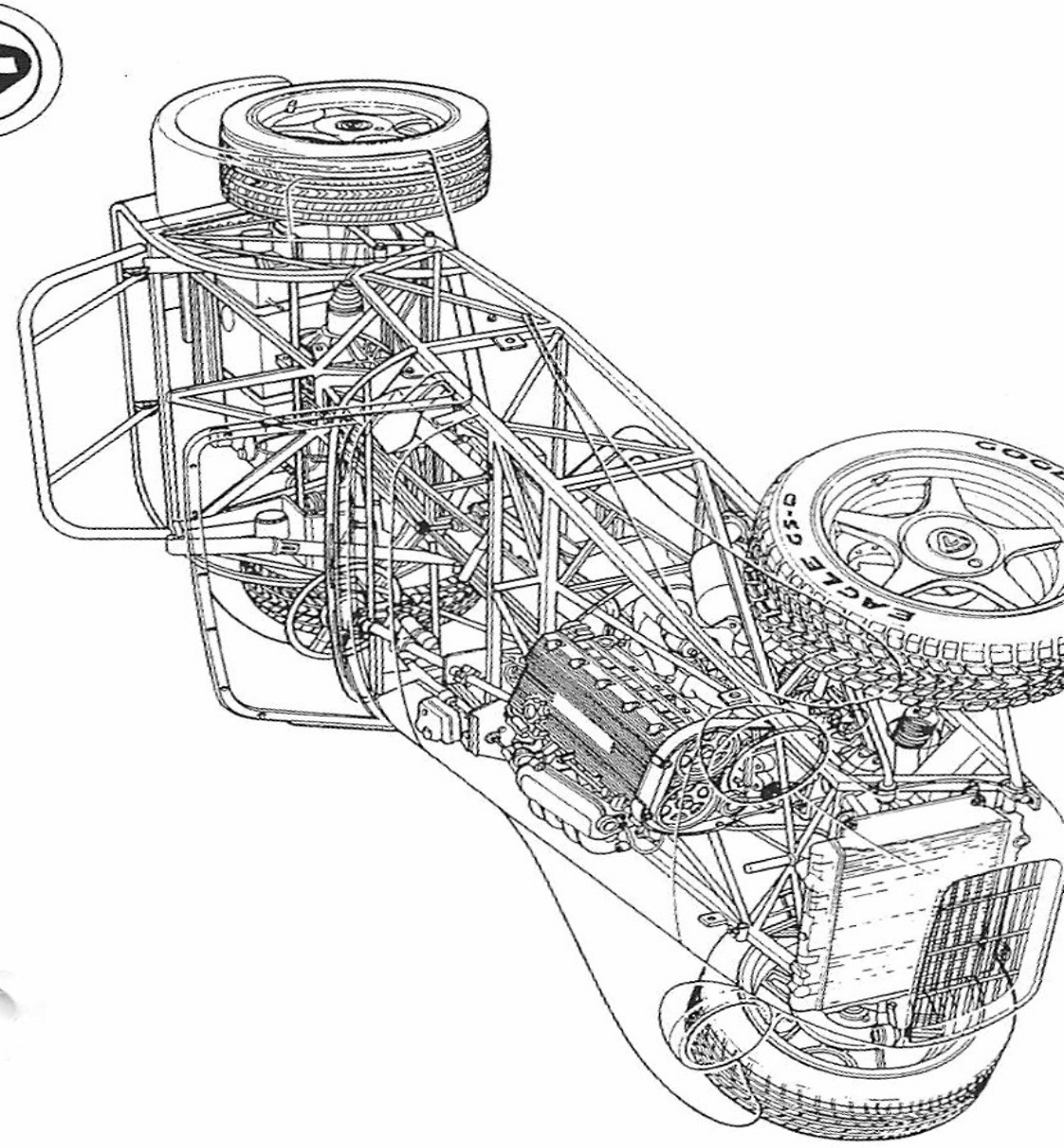
* 5 and 6 speed gearboxes use Ford oil, part number 5015547, alternatively EP80 gear oil may be used.

Caterham Cars use and recommend BP lubricants especially Visco 2000 Engine Oil

Coolant

Water : antifreeze ratio :- 2 : 1,

Capacity:- 9.0 pints (5.1 litres) without heater,
10.0 pints (5.7 litres) with heater
Rover water capacity 1.0 pint lower than above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PREFACE

CATERHAM SUPER SEVEN OWNER'S MANUAL

This manual is prepared in order to ensure that owners, wherever in the world they may live, are able to appreciate the capabilities of their Caterham Seven to the full and to provide a maintenance record which can be passed on to subsequent owners.

Due to the high performance of even the lowest powered Caterham Seven, frequent and prompt maintenance is extremely important and this manual therefore describes how to perform all the normal servicing tasks, although this is not a workshop manual and does not cover major repairs. Caterham do however have a number of approved service agents who can carry out all such work and of course all customers are welcome to return their cars to our factory at Crayford.

Although the information provided primarily covers current specification vehicles, the service sections also refer to some specifications no longer in production at Caterham such as Cosworth BDR powered cars and earlier De Dion chassis.

Every car sold by Caterham is unique and therefore we have created a full computer record of the specification of each car as it leaves the factory. It is therefore possible to obtain the correct parts for virtually any car by quoting the chassis number when ordering parts and optional extras for later fitting.

This manual also includes a section covering the completion of cars supplied in Component form for certain markets including the United Kingdom, and a brief explanation of the car's controls for new owners.

The Seven has always been a car intended for motor sport right from its inception in the 1950's, and Caterham Cars actively support their own club level racing series in Britain. A section has been included giving an introduction to various forms of competition.

It is Caterham Cars' intention to make Seven ownership as pleasurable as possible, therefore we hope that this manual provides the answers to the majority of owners' questions.

Graham Nearn

CATERHAM SUPER SEVEN OWNERS MANUAL

June 1995

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SECTION 1

INTRODUCTION

The Lotus Seven was originally launched to the public at the Earls Court Motor Show in 1957 as a successor to the highly successful, though relatively low volume, Lotus 6 which ceased production in 1955.

The original Series 1 Seven was produced with a Ford sidevalve engine and a 3-speed gearbox although later models were available with the Coventry Climax 1097cc engine or the BMC 948cc engine from the Austin A35, with the 4-speed BMC gearbox.

In 1960 after around 240 Series 1s were completed, the Series 2 was introduced. This had a lighter spaceframe, clamshell front wings were fitted for the first time, and a revised fibreglass nosecone, which remains outwardly unchanged to this day.

Engine options followed on from the Series 1 although the 100E engine was soon phased out in favour of better BMC engines from the Austin Healey Sprite and the Ford 997cc 105E engine as fitted to the newly introduced Anglia.

Further options included the Ford Classic 109E 1340cc engine from 1961, and later the 1498cc 116E engine from the Cortina followed in 1962. These later models were known as Super Sevens and in Cosworth tuned form made shatteringly fast road/club race cars for their day.

The Series 2 introduced the 'A' frame rear suspension which is still in production today and were made in considerably greater numbers than other Lotus Seven models, a total of some 1310 being built.

It was not until 1968 that the Series 3 Seven was launched and in appearance looked similar to the Series 2 except for wider wings to accommodate wider wheels and tyres. The chassis frame, however, was considerably stiffer and the 1600cc Ford 2265E crossflow engine and Ford Escort rear axle became the basic specification. This axle, incidentally, replaced that from the Standard 10 dating back to the early fifties which somehow Lotus had continued to use in the Series 2 right until the end. Axle failures were not uncommon!

The Super Seven was now available with the Lotus Twin-Cam for the first time and this, especially in 125 BHP Holbay form, became the fastest production Seven yet. Around 265 Series 3s were made.

By 1970 it was felt that the Seven, after 12 years, had become very dated and a successor, intended to reach the fast growing Beach Buggy market as well as that currently accommodated, was launched. This, of course, was the Seven Series 4.

Although intended to retain the character of the Seven, it was very different in appearance, having a simpler steel ladder frame chassis with stressed steel side panels enclosed by a fibreglass body. Engine options were carried over from the Series 3, and around 600 cars were built by 1973.

Colin Chapman had for many years wanted to phase out the Seven from an increasingly upmarket range and indeed, without the efforts of Graham Nearn, it would probably have been dropped as early as 1966.

Seven production had continued erratically for some years, firstly at Lotus Components and then at Lotus Racing, which closed in 1971.

Series 4s were manufactured in a corner of the main factory for a while, alongside Elans and Europas, before the impending launch of the new Elite, and increasing financial difficulties at Hethel finally spelt the end of the car.

In May 1973 Graham Nearn's Caterham Cars took over all the remaining Seven parts, jigs, moulds and, most importantly, the manufacturing rights from Lotus. Subsequently about 40 series 4 Caterham Sevens were sold until it was phased out largely due to problems with component suppliers in 1974.

Much interest continued to be expressed in the classic Series 3 Seven, however, which enthusiasts had always preferred over the heavier and less agile Series 4. As a result, Caterham introduced an improved version of the Series 3 with a considerably strengthened chassis and numerous detailed modifications to upgrade the car in every way whilst preserving its appearance and character.

The Caterham Seven has therefore continued outwardly unchanged. Its specification has changed notably in respect of its engines and transmissions, as suppliers and motor manufacturers have updated their products.

Initially Caterham Sevens were fitted with Ford Escort axles, but supplies of this axle dried up in 1981 with the introduction of the FWD Mk III Escort. The replacement Morris Marina/Ital axle was fitted to approximately 500 Caterham Seven Series 3's between 1981 and 1986 when it too ceased to be available. Seeing that the writing was on the wall for small beam axles, Caterham then designed their own De Dion rear suspension, based on Ford Sierra parts, which

was introduced in 1986. This in turn has seen further improvement with the fitment of rear disc brakes in 1989 along with a sealed pedal box and adjustable pedals.

For 1991 the De Dion chassis was revised incorporating a double wishbone front suspension and revised rear suspension derived from the Vauxhall engined race series cars to further improve handling. Provision was also made to accommodate inertia reel safety belts and, in redesigning the rear of the car, more boot space was achieved.

The De Dion chassis was again revised for 1994 to further improve chassis performance, ease of build, and serviceability. Removable upper engine bay diagonals improve access to the engine bay, and at the same time the length and width of the pedalbox was increased, improving comfort.

By the mid eighties, supplies of Ford Escort Sport semi-close ratio gearboxes also dried up so the chassis was re-engineered to accept the 5-speed gearbox from the V6 Sierra. Caterham have designed and manufactured their own special bellhousings to mate this gearbox, in close ratio form, to both the Rover and Vauxhall 16 valve engines.

Caterham have now engineered a close ratio six speed gearbox for the Seven, with ratios chosen specifically to suit the character of the Seven and the engines used in it. The gearbox is a direct replacement for the Ford five speed gearbox and can be retro-fitted in cars fitted with the five speed box.

When Lotus Twin-Cam engines ceased to be manufactured, Caterham first turned to Vegantune who were making their own version of this unit. Around 40 Sevens were fitted with this VTA engine of which 30 were exported.

Demand for an engine developing more power than the standard Ford 1600GT led Caterham to introduce their 'Sprint' specification, basically the 1600GT with twin Weber 40 DCOE carburettors and a mild performance camshaft. In 1984, the 'Supersprint' version of the same Ford engine was launched, this time bored out to 1690cc with larger valves and a high lift camshaft to produce some 135 BHP with minimal loss of tractability.

However the public continued to demand even more power and in addition sophistication, so the Ford Cosworth BDR with double overhead camshafts and 16 valves became available in 1985 followed by the even faster 'HPC' specification in late 1986. This engine has now been replaced by the 2 litre 16

valve Vauxhall engine which provides even more power and, along with the Rover K Series unit, enables the Seven to meet emissions legislation.

In turn, the Rover engine has been improved in conjunction with Rover to produce the "Supersport" specification which means that performance from the 16 valve 1400cc unit is now very similar to the Ford powered "Supersprint" cars which continue to be available.

In 1993 the 'Classic' live axle car was introduced as a low cost entry level Seven. Using a single carburettor Ford crossflow engine and a reconditioned 4 speed gearbox and Ital axle, this represents excellent value for money.

In its earliest days, the Seven was sold in kit form to avoid purchase tax which in the late 1950's was about 40%! This practise continued throughout the car's long production history, although the imposition of Value Added Tax meant that the savings were no longer so great, and the level to which a car had to be disassembled to become a kit rather than a car were the subject of constant negotiation with Customs and Exise.

Completed cars were and are offered for overseas markets, but Caterham have traditionally sold cars in Component form, and latterly in Kit form also, for those customers wishing to save money or enjoy building the whole car themselves and by using new or used parts of their choice.

With current EEC legislation it is now possible to sell certain Caterham models fully built in the United Kingdom and in Europe, though the majority of engine specifications available do not satisfy noise and emission regulations and therefore remain available in kit or virtually built Component form.

SECTION 2

COMPONENT CAR ASSEMBLY

A Caterham Seven supplied in Component form include all the parts necessary to put the car on the road except number plates. The amount of work required to complete the car is the minimum legally necessary to obtain exemption from National Type Approval as a home built car. This section therefore contains instructions covering the work needed, followed by the measures which you will have to take in order to get your car registered in the United Kingdom.

Before release from our factory, all Component cars will have been filled with oil and water, and test run and tuned, so no further adjustments will therefore be necessary. When the steps outlined in this section are completed by the builder, the car will be fully driveable, however we advise that the checks outlined in section 2.19 are carried out, in particular those relating to oil and water levels.

Component car customers are welcome to return their cars to the factory for a free check once completed although it will be necessary to make an appointment. Allow around two weeks notice and contact the Service Department at Dartford on 01322 559124 to book your car in.

In order to get access to the engine compartment, you will have to remove both the bonnet and nosecone. The bonnet is secured by two over-centre clips at the rear and two spring clips at the front. When releasing the front clips it helps to hold the bonnet down while lifting the clip free. On cars fitted with Weber DCOE side draught carburettors, the air cleaners are a close fit into the bonnet aperture therefore care should be taken to ease the bonnet over the filters as it is removed.

The nosecone is held on by four Dzus fasteners which are released by a screwdriver or penny coin. The ideal tool for this is a short broad bladed screwdriver. When all the fasteners are released, the nosecone is removed by tilting up its rear edge and gently easing forward over the radiator and the front of the chassis. When refitting, reverse this procedure but secure the front fasteners located underneath first. Dzus fasteners will secure or release using only a 90 degree turn, excessive twisting can dislocate or damage their springs.

Checklist Of Operations To Be Carried Out

ENGINE

1) Connect fuel line to fuel pump (Ford)
2) Connect fuel line to carburettors (Vauxhall Carbs)
3) Connect and adjust throttle cable (Ford Only)
4) Fit exhaust tailpipe (Ford rear exit only)
5) Fit the exhaust silencer guard

CHASSIS

6) Fit and tighten wheel nuts and centre caps
7) Align and fit steering wheel

BODYWORK

8) Fit front wings (flared)
9) Fit front wings (cycle)

ELECTRICAL

10) Fit and wire headlamps
11) Fit and wire front indicators
12) Fit and wire front indicator repeaters
13) Connect horns

MISCELLANEOUS

14) Fit 4 or 6 point harnesses (when specified)
15) Fit seats
16) Fit interior mirror
17) Nosecone badge
18) Optional extras
19) Final checks before taking to the road
20) Registration Procedure

Detailed fitting Instructions

2.1 Connection of Fuel Line - Ford Engines

The fuel line is connected to the mechanical fuel pump which is situated on the right hand side of the engine block toward the rear. The loose rubber fuel hose needs to be connected to the input side of the fuel pump where it should be secured using two "monoclamp" clamps. Squeeze these clips with a pair of pincers to tighten, noting that access is limited although not impossible.

2.2 Connection of Fuel Line - Vauxhall Carburettor Engines

The fuel pump on the Vauxhall is electrically powered and mounted at the rear of the car where it is fully connected. The fuel pipe will however need to be attached directly to the front carburettor union. The connection is effected by a short length of flexible tube which is secured using two "monoclamp" clips. Squeeze these with a pair of pincers to tighten.

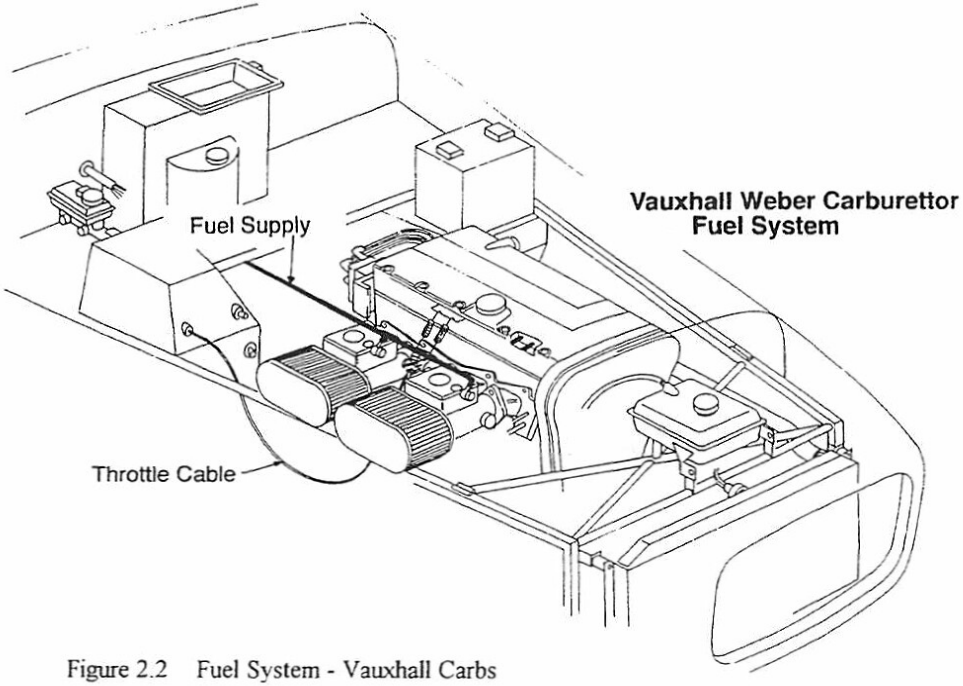


Figure 2.2 Fuel System - Vauxhall Carbs

2.3 Attachment of Throttle Cable (Ford Engines Only)

The throttle cable should be connected at the carburettor end first. With twin Weber DCOE's it feeds upward from underneath, its outer cable being located by the bracket connecting the two carburettors, and the nipple is attached to the throttle lever.

Push the barrel halfway through the end of the lever and slot the inner cable into it, allowing enough slack to keep the nipple clear then push the barrel fully home. The inner cable is pulled down until the nipple locates in the recess in the barrel. Attach the 'hairpin' throttle spring between the outer cable locating bracket and the throttle lever, bending the end of the spring over to prevent it coming out or fouling the body of the carburettor (N.B. The cable should not pass around the steering column or lay across the battery)

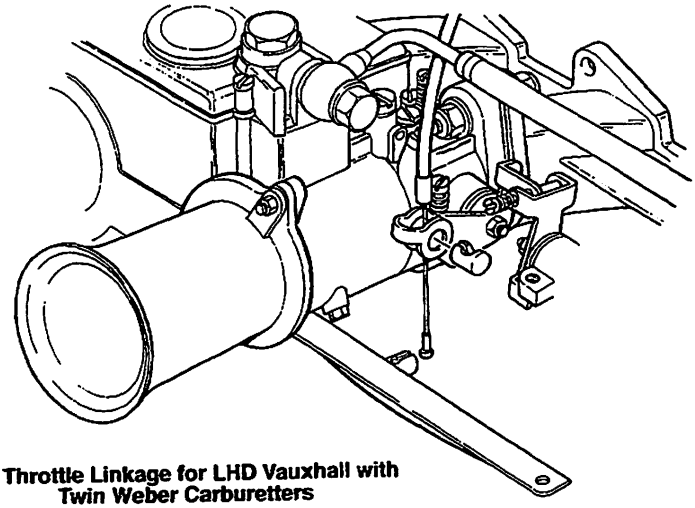
Remove the eight screws holding the pedal box cover in place and lift it clear to expose the pedals in order that the other end of the throttle cable can be attached. This is threaded to allow adjustment and has two nuts threaded onto it for this purpose. The nipple on the inner cable is held onto the accelerator pedal using a special clip. The pedal position is adjustable, as there are three mounting points to which the pedal can be attached. As supplied from the factory the pedal will be fitted in the central position. There is an adjustable throttle stop under the lip above the pedal. Having chosen a pedal position to suit your ideal driving position, the throttle cable can be adjusted. It is important when adjusting the cable to make certain that the carburettor butterflies are fully open when the pedal just reaches the full extent of its travel and that with the pedal released the butterflies are closed.

Cars fitted with a single carburettor are similarly connected, though the throttle mechanism is much more accessible.

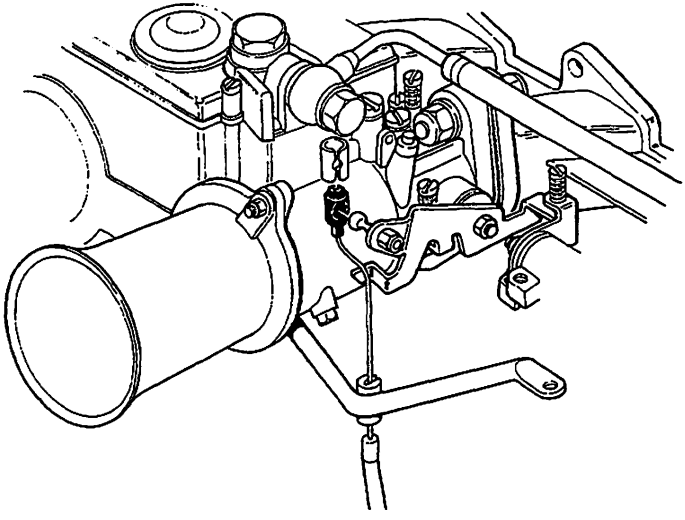
On left hand drive cars fitted with DCOE carburettors the cable fits the other way up, the inner cable attaching to the fixed bracket and the outer to the lever. The cable is then routed over the top of the engine.

2.4 Fit Exhaust Tailpipe (Ford rear exit only)

The inlet manifold and silencer will already be fitted to the car, but the tail pipe leading from the silencer to the back of the car needs to be attached. To do this it will firstly be necessary to jack up the car and remove the left hand rear wheel.



Throttle Linkage for LHD Vauxhall with Twin Weber Carburetters



Throttle Linkage for RHD Vauxhall with Twin Weber Carburetters

Figure 2.3 Throttle cable attachment - Ford engines

Fit the exhaust clamp loosely over the pipe emerging from the back of the silencer and, having smeared its end with Holts Firegum or similar to obtain a good seal, slide the stainless steel tailpipe onto it as far as it will go. This pipe should be twisted until it clears the lower chassis tube, the bolt head used to secure the "A" frame and the inside edge of the rear tyre. When suitably positioned, tighten the clamp evenly using a 1/2" spanner and wipe away the surplus sealant.

The tailpipe is supported at the rear from a bracket protruding immediately behind the rear axle. A reinforced rubber strap is provided to suspend the tailpipe with a hole at one end and a hook at the other which is secured to the tailpipe with a jubilee clip. The bracket on the chassis will need a 1/4" hole to be drilled to attach the strap, such that it suspends the tailpipe accurately in position. Ensure that the tailpipe is not pulled up so far as to put stress onto the exhaust system which will lead to premature failure of either the strap or the rubber bobbin which supports the silencer onto its bracket. When drilled, the strap is secured to the bracket using the 1/4" bolt, washers and nyloc nut provided.

Test fit the rear wheel and double check that the exhaust does not touch it or the chassis at any point and that there is sufficient clearance to allow for movement of the exhaust and wheel. Remember the tyre will move towards the exhaust during cornering. Tighten the wheel when correctly adjusted.

2.5 Exhaust Silencer Guard

The aluminium silencer guard should be fitted over the exposed part of the silencer where it is secured by two or three very long Jubilee clips. These should first be fully unscrewed and the ends parted so that they can be slotted into the channels formed on the underside of the guard. If the exhaust silencer contains a catalyst, no clip should be fitted over the catalyst as this gets extremely hot in service. Leaving the clips disconnected, slide the guard over the silencer and then reconnect them so that the silencer is encircled.

Tighten the clips with a screwdriver ensuring that the guard is correctly positioned and that the clips are not directly under the silencer. The worm drive clip should be positioned between the body of the car and the lower half of the exhaust, such that it is clear of the bodywork. This will prevent the clip from being damaged in the event of the silencer grounding.

The guard is not just provided for appearance since it prevents the passenger from inadvertently touching the hot silencer and should therefore be positioned so

that it fulfils this function. However, take care to ensure that a gap of 1/4" to 1/2" is left between the guard and the bodywork, especially if your car has been painted, which will allow for movement of the exhaust on its mountings once the engine is running.

2.6 Wheels and Tyres

With the car's wheels on the ground, the wheel nuts should now be tightened to 55 lb ft, ideally using a good quality torque wrench. Tyre pressures should be set as follows:-

Wheel Size	Pressure
13" & 14"	20psi (1.4 bar)
15"	18psi (1.3 bar)
16"	16psi (1.2 bar)

Please note that wheel / tyre assemblies are supplied inflated to around 40 p.s.i. to ensure that the tyres are correctly seated on the wheels. Therefore you will probably find it necessary to let them down.

Finally fit the wheel centre caps, which on 13" and 14" alloy wheels are a push fit, into the wheels, except for the spare which is clamped into place through its centre. The optional 15" and 16" Caterham designed alloy wheels have alloy centre caps held in place by puzzle locks for security.

It is very important with new alloy wheels that they are re-tightened after 100 to 200 miles. This is because the steel inserts upon which the wheel nuts bear can settle slightly into the alloy wheel, allowing wheel nut torque to slacken slightly.

2.7 Steering Wheel

having established the straight ahead position for the steering, fit the steering wheel over the splines on the column. Double check this positioning by pushing the car backwards and forwards a few yards on smooth level ground. Assuming that you are happy with the wheel's alignment, lock it in position using the 1/2" nyloc nut and washer.

2.8 Front Wings - Flared

The fibreglass front wings are supplied jig drilled to suit the fittings in the side of the body. The front wingstays will have been fitted to the chassis as supplied.

The wings should be attached to the side panels with six 5mm x 20mm bolts with 3/4" diameter plain washers and two 5/16"x3/4" bolts with plain washers. At the same time, the rubber piping should be fitted between the wing and the body, it should be trimmed to length and cut in a series of v's to allow it to flex around the curves and miss the bolts. The bolts should be tightened up such that the beading of the wing piping sits neatly on top of the joint with the flat strip clamped.

Do not overtighten the fixing screws as this may cause the riv-nuts to rotate in the sidepanel, or strip their threads.

With the wings fitted to the side panel, it may be necessary to adjust the wingstay positions to match the profile of the wing, ensuring they stay vertical. If the wingstay needs repositioning, slacken the front upper wishbone and damper bolts and the two pinch bolts on top of the chassis. Adjust the stays' position and re-tighten the bolts. (Front upper wishbone/damper bolt to 60 lbft)

The wings are attached to the wingstay using the front mounting bolts for the indicator side repeaters. These should be aligned to suit the wingstay and ensure symmetry between both sides. Both the wingstay and the wing will need to be drilled for fitment, see section 2.12 for details

2.9 Front Wings - Cycle

The front cycle wings bolt to the tubular wingstays which are rigidly mounted to the front suspension uprights as supplied. 5mm x 35mm pozidrive bolts are used for the wings, passed downwards through the wing and the round tube of the wingstay.

The wing will have been marked with the positions for the front two mounting bolts for each wing. These should be drilled through with a 5mm drill , taking extreme care to avoid damaging the gel-coat finish - slow drill speeds should be used.

With the front wheels fitted, place the wing in position on the stay, so the bolt holes are over the centreline of the forward round wingstay tube, ensuring the

wing is centralised over the tyre. Mark the positions for the bolts onto the wingstay.

With the wing removed and the wheel & tyre protected or removed, the holes can be drilled through the stay. To prevent the drill from wandering, centre-punch the wingstay then drill the two holes to 6mm. TAKE CARE TO AVOID DAMAGING THE TYRES.

Loosely refit the cycle wing and wheel/tyre to check the wingstays' alignment relative to the wheel, then remove the wings. Place a strip of masking tape across the tyre underneath the drilled tube of the wingstay, then mark onto this the lateral positions of the two holes. Rotate the wheel so that the masking tape is under the rear tube of the wingstay and transfer the bolt hole positions to the tube. Centre-punch and drill to 6mm as at the front.

Refit the cycle wing, loosely bolting it at the front and aligning it over the tyre, then carefully remove the wheel without disturbing the wing. Mark the underneath of the wing with the bolt hole positions, then remove the wing. Drill a small pilot hole from underneath, taking extreme care to avoid damaging the gel-coat, then once you have checked that these are correctly positioned, drill through from above to 5mm.

Bolt the wings to the stays with 5mm x 35mm pozidrive screws with nylocs, with a strip of self adhesive foam on the top of the wingstay and rubber washers under the heads of the bolts.

2.10 Headlamps

The headlamps are mounted in bowls, the base of which attach to the wing stays (or separate brackets on cycle wing cars). The front indicator mountings (plastic cones on De Dion cars or steel brackets on live axle cars) also attach at the same point and are secured in place on top of the stays by the nut and lockwasher holding the bowl assemblies. These large nuts also serve as adjusters since when slackened the bowls can be moved to align the headlamp beams and when tightened the headlamp direction is fixed.

The flasher brackets should be positioned so that the indicator lens faces forward, in front of the bracket.

The wiring for the headlamps and indicators is part of the main loom which is fed out through rubber grommets provided in the outer skin of the chassis. The head and sidelight wiring which consists of four wires terminating in bullet connectors,

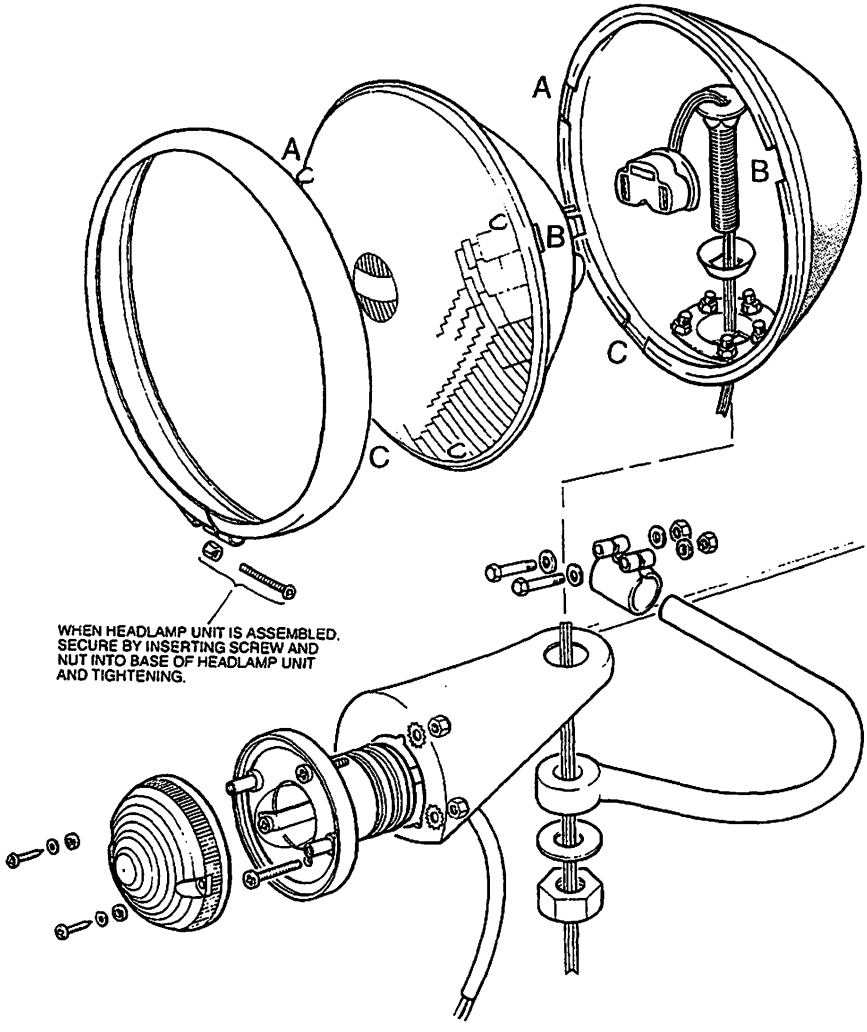


Figure 2.10A Headlamp and Indicator Fitment - Cycle Wing Cars

should be fed up through the hollow centre of the headlamp bowl mounting stem into the bowl itself where it can be connected to the small sub-loom feeding the headlamp plug.

Take care to match the main loom colours with those of the sub-loom, the metal clamp and screw provided in the Lucas manufactured headlamp bowls are not necessary and can be discarded.

The light unit itself is held in place by the chrome plated rims at the front of the headlamp bowls. Remove these rims by releasing the clamp screw which only need to be undone sufficiently to allow the rim to clip off.

Connect the headlamp wiring plugs and clip the sidelights into the back of the headlamps. Put the headlight units in place in the shells, ensuring they are the correct way up, and slip the rims into place. Tighten the clamp screws to hold the light units in place

If you find the headlights are a loose fit within the bowls after the rim has been tightened, the headlamp shell may need to be adjusted as follows. With the headlight unit removed, bend out the three locating tabs in the headlamp bowls slightly. This will force the headlamps forward slightly, so they are tightly clamped by the ring.

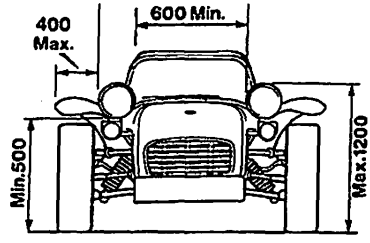


Figure 2.10B Headlamp Positions

Final alignment should be carried out using a headlight beam aligning device at your local garage or service agent, but a close approximation can be achieved by positioning the car in front of a suitable wall or garage door and, having loosened the bowl securing nuts, aligning the beams to face slightly downwards and to the left. Re-tighten the nuts to secure in position.

2.11 Front Indicators

Fit the rubber gaskets supplied over the rear of the indicator units and insert them into the holes provided in the flasher brackets. Secure using 5mm pozidrive screws.

The indicator/repeaters are wired up at the same time, so for flared winged cars these will need to have been fitted first (see sections 2.9 & 2.12).

There are therefore 4 wires to connect (Cycle wing cars 2 only) which are green/red LH (or green/white RH) and black from the loom, and green and black from the indicator and repeater. Connect the black earth wires together and similarly the remaining green and green/red or green/white.

With the wiring attached, the indicator unit is slid back into and secured to the flasher bracket with 3/16" nyloc nuts with the lens removed. Finally refit the lens and ensure that all the wiring is tied back out of harms way, paying particular attention to clearance to the front wheels.

2.12 Front Indicator Repeaters (Flared Wing only)

These are attached to the outer edge of the front wings so the front mounting bolt lines up with the wingstay underneath. Dismantle the repeater units, removing both bulb and lens. Drill through the front wings at the marked points with a 5mm drill at the outer holes and a 9/16" drill for the wiring in the centre.

Prise out the short studs pressed into the units and bolt into place using the 5mm x 16mm pozidrive screws and nyloc nuts provided. The studs are too short and are therefore discarded. Attach the black earth wire to one of the mounting screws, enlarging the tag hole to suit and then replace the bulb and lens.

The wiring from the repeaters should be tied to the wing stays, well clear of the tyres using Tyraps.

2.13 Horn Connection

The twin electric horns are located on and behind the steering rack platform and secured to two studs welded to the platform. Note that Lucas manufactured horns should be fitted with the red side downwards to prevent water ingress.

The horns are connected using one purple and yellow wire to each horn.

Should a Momo or a Racetech steering wheel have been specified, a separate button for the horn will have been fitted on the dash within easy reach of the steering wheel.

Air Horns are an option, but if specified are partially fitted. The horns themselves are already attached to the left hand side of the heater deflector plate, if specified, (right hand side on LHD cars) so only the compressor will need to be fitted.

This is attached to the vertical bulkhead immediately behind the heater adjacent to the air horns themselves using the 8mm bolts provided. The clear tubing provided should be used to connect the horns to the compressor and trimmed to length as appropriate.

The wiring for the air horns is provided in the loom and no additional fuses or relays are required. Two wires (one black, one purple/white) exit from the loom in the area of the fuse box which is located inside the car under the dashboard. Drill a hole in the bulkhead close to where the connections are on the compressor and after positioning a rubber grommet in this hole pass the wires through. Terminals should be either crimped or soldered onto the end of these wires which are connected as follows:- Black wire - negative terminal on compressor, Purple/white - positive terminal on compressor The air horns will now work through the existing horn switch located on the dashboard.

2.14 4 and 6 Point Harnesses (Where Specified)

Caterham Sevens are fitted as standard with either inertia reel or static belts for which all the mountings are provided to comply with EEC legal requirements. The standard seat belts will have been fully fitted in the factory, however if four or six point harnesses have been specified these will need to be fitted by the customer

The competition four-point full harness belts use the top mountings provided on the rear crossmember immediately behind the seats and the lower mountings on either side of the seat. However since these cannot be fastened with one hand

they are not strictly legal for use on the road. If a six point harness is being used with a race seat, the crotch straps attach to the unused seat mountings, otherwise the same mounting points are used.

2.15 Seats

With the seat belts in place the seats can be fitted, if bench seats are being fitted in combination with 4 point harnesses, the seat back needs to be positioned before attaching the top seat belt mountings. Individual seats are bolted to the chassis at the front and the rear, however before fitting the seats check that the holes are clear at the rear, noting that there is a machined aluminium spacer fitted between the folded steel bracket and the floorpan on De Dion cars

Loosely fit the seats into the cockpit, so the runners slot into place over the mounting holes. With the seat as far back on its runners as possible, fit the two 8mm panhead bolts through the front seat mountings and loosely fit nyloc nuts. Slide the seat forwards and fit the two 5/16" x 1 1/2" bolts through the rear mountings, again with nyloc nuts. If an S type seat is being fitted, the lowest cushion of the backrest is removable to improve access to these bolts. Once the seat is fully in position, the bolts should be tightened up.

2.16 Interior Mirror

This is stuck by the adhesive pad on its base to the inside of the windscreen as high as possible on the centre line of the car. You should note that the mirror can be rotated through 180 degrees on its stalk to minimise the windscreen area obstructed or to provide a better rear view for shorter drivers.

2.17 Nose Cone Badges

The nose cone will be supplied with two holes drilled in it to mate up with the two locating prongs in the back of the badge. To fit, simply remove the backing paper from the badge and press down in place, ensuring the surface is thoroughly clean.

2.18 Optional Extras

The majority of extras ordered with a Component car are factory fitted, the most notable exception being air horns which are covered under section 2.13. Major items such as the heater or oil cooler require no work and boot and tonneau covers are fully fitted.

2.19 Final Checks before taking to the Road

As stated at the start of this section, the car will have been filled with oil and water before it left the factory. However, before starting the car, we suggest you run through the following checklist:

I) Engine oil level should be up to the arrow marked on the dipstick, top up if necessary. Ford powered cars will have been filled with Mobil Super XHP 15W/40 oil and 16 valve engines use Mobil 1 or BP Visco 2000.

ii) Remove the radiator cap and check that the header neck is filled with water/antifreeze and that the overflow bottle behind the radiator is about 1/4 full, for Ford powered cars, and up to the seam on the expansion tank for 16 valve cars. Top up with water if necessary.

iii) Check that the brake fluid level is up to the maximum mark on the reservoir, topping up if necessary.

iv) Check that all lights and electrical equipment are working correctly.

v) Ford powered cars should be filled with 97 octane four-star leaded fuel. Subsequently unleaded fuel can be used although one tank in four should be filled with leaded. In the light of recent concerns regarding levels of benzene in unleaded fuels, Caterham recommend exclusive use of four star fuel. Vauxhall or Rover engined cars must use unleaded only, super unleaded in the case of the K series Supersport.

vi) If the engine has not been run for some weeks it is important in order to prolong the life of its bearings to build up some oil pressure before starting it. We recommend therefore that with cars fitted with Weber carburettors you turn the engine over on the starter WITHOUT touching the throttle until pressure registers on the gauge. Fuel injected cars will start regardless therefore it will be necessary to disconnect the lead from the positive terminal on the coil on Rover powered cars, or on Vauxhalls the 3 pin plug should be removed from the coil pack.

Normal cold start procedure can then be followed.

We will be happy to carry out a post-build check on your car free of charge once it is completed, but if it is not practical for you to return to the factory and you have any doubts please do not hesitate to telephone us and we will try and resolve any problems you may have. Alternatively the car can be checked at any

our post build check centres, details of which will have been supplied with your car.

The completion of the Component car is as straight forward as we can legally make it and we are keen that all customers should end up with a car with which they are totally happy.

2.20 Registration Procedure

As a car assembled from all new parts in the case of a De Dion car, a Component car is registered as a new vehicle and therefore entitled to a current registration prefix rather than the "Q" plate of a Kit car. In order to prove this to the licensing authorities you are issued with a "Certificate of Newness" by Caterham Cars although it will no longer be necessary to pay the Special Car Tax due to Customs and Exise. VAT will already have been charged on your purchase invoice. Live axle cars currently have reconditioned axles and gearboxes and therefore cannot be issued with a certificate of newness

The procedure for registering a Component Car therefore is as follows:

1 Obtain the form V55/5 from your nearest vehicle licensing office, these are not available from Post offices.

2 Arrange for an insurance cover note specifying just the chassis number of your vehicle. Please note that Caterham Cars have a concessionary insurance scheme which should help you to get competitively priced cover.

3 Present yourself at the vehicle licensing centre - not your local Post Office - with the following information:

a) Completed form V55/5
b) Certificate of Insurance
c) Certificate of Newness (where relevant)
d) Your cheque (or cash) for the Road Tax.

You should then be issued with a current prefix registration number and a Tax disc, although it is possible that they may require that your car be inspected prior to registration. In this case they will arrange either to inspect your car at home or for you to transport it to their test centre as convenient. This inspection is purely so that they can ascertain that the car is genuinely new and as described, not an MOT type test. However, an inspection, though normal with a kit built car,

should not be necessary on a Component car with a certificate of Newness from Caterham Cars.

4 Before taking your car onto the road for the first time order a set of number plates and notify your insurers of the registration.

If you have any difficulties, please do not hesitate to contact Caterham Cars and we will do our best to help.

SECTION 3

BEFORE TAKING TO THE ROAD

3.1 Instruments and Switches

Before using the Seven on the road, owners should study the diagram 3.1 overleaf to familiarise themselves with the position of the instruments and switches. Their operation is generally self-evident with the following exceptions which need some explanation.

1.1 Brake Test Switch

This provides a means of checking that the fluid level in the brake master cylinder is correct. If the warning light within the switch should come on in service it means that the brake fluid level has dropped DANGEROUSLY low and the car must not be driven in this condition. In normal use, brake pad wear will not cause the fluid to drop to such an extent that this light illuminates, therefore illumination indicates a failure within the brake system.

To check that this warning circuit is operating correctly, turn on the test switch regularly to illuminate the warning light.

1.2 Turn Indicators

The turn indicators are operated from a 3 position switch in the centre of the facia, and do not self cancel. It is important to remember to move this switch to the centre OFF position after use.

1.3 Intermittent Windscreen Wipe Facility

This works as follows:-

To turn on: Flick wiper switch on and then off again.

To turn off: Repeat the above. There is no means of varying the speed of intermittent wipe.

1.4 Heater Controls

The heater is an optional extra on the Seven, as is a separate regulator to control the level of heat given off by cutting the flow of hot water into the heater matrix. If fitted, (standard on De Dion cars) the control for the regulator is located on the engine compartment bulkhead, above the driver's right knee (RHD cars). The volume of warm air flowing through the heater into the car is controlled by a two speed electric fan, the switch for which is fitted regardless of whether a heater has been specified. Without the regulator control, there may be some heat conducted into the footwells even with the fan switched off.

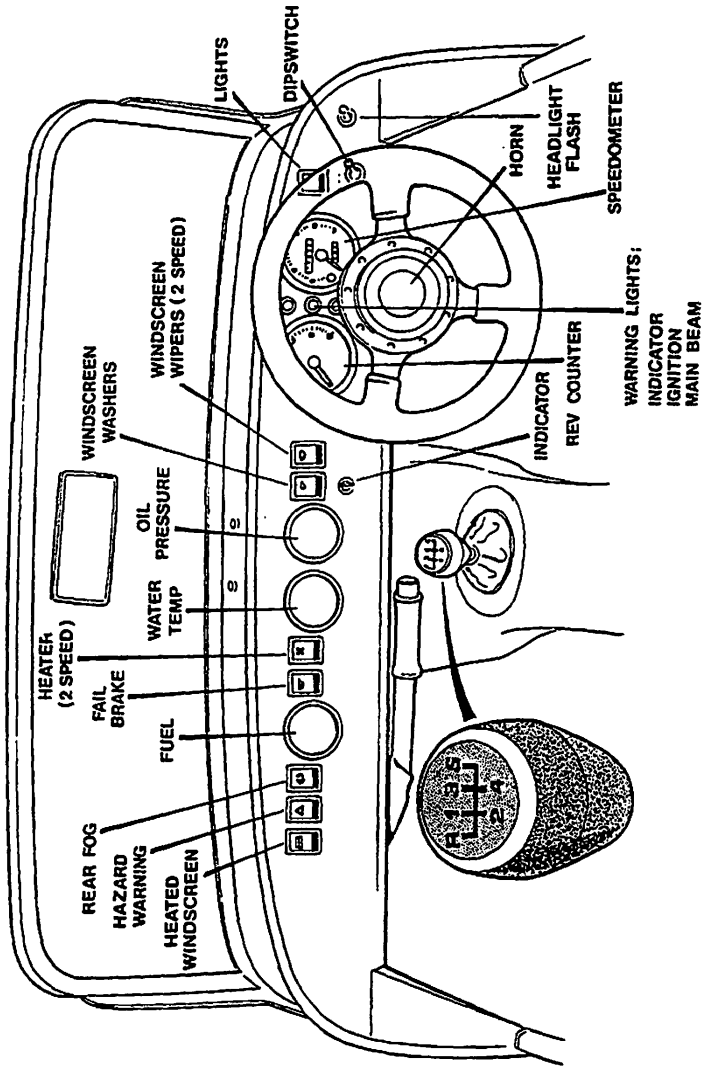


Figure 3.1 Dashboard Layout - Right Hand Drive Car

3.2 Pedal Adjustment Facility

All cars are now fitted with a pedal box assembly which incorporates sufficient movement to cater for most sizes and shapes of drivers. This is not intended to give instant adjustment but provides an opportunity for the owner to tailor an optimum driving position.

The range of movement is limited and adjustment towards the extremes of travel will lead to the pedals lifting to a somewhat high position, but we believe that in combination with the adjustable seat, the majority of drivers will find a suitable setting. (see Fig. 6.5)

When a De Dion kit leaves the factory the pedals are set in the middle of three positions, unless specified otherwise, and can thus be moved backwards and forwards as required. It is important not to move the pedals too far forwards however as this will restrict pedal travel, interfering with the correct operation of the brake master cylinder. This may prevent the dual circuit fail safe facility from operating thus rendering your vehicle both illegal and potentially dangerous. A Classic only has two positions, of which the front is used when delivered from the factory.

In order to move the pedals the procedure set out below should be followed:-

i) Remove the pedal box lid which is held in place by 8 screws.

ii) Install the clutch cable adjusting at the bellhousing end in order to bring it level with the brake pedal and also the throttle cable.

iii) Position the driving seat to suit your reach to the steering wheel and gearlever and assess whether and how far the pedals need to be moved.

iv) Firstly adjust the brake pedal, which can be achieved in two ways.

A) By increasing the effective length of the master cylinder pushrod which has an adjustable shackle.

B) By moving the fulcrum position from the middle hole to either the rear hole or the front hole where appropriate, which also moves the clutch pedal. Note that if the movement required is more than 2" then the adjustment available on the pushrod will not be sufficient.

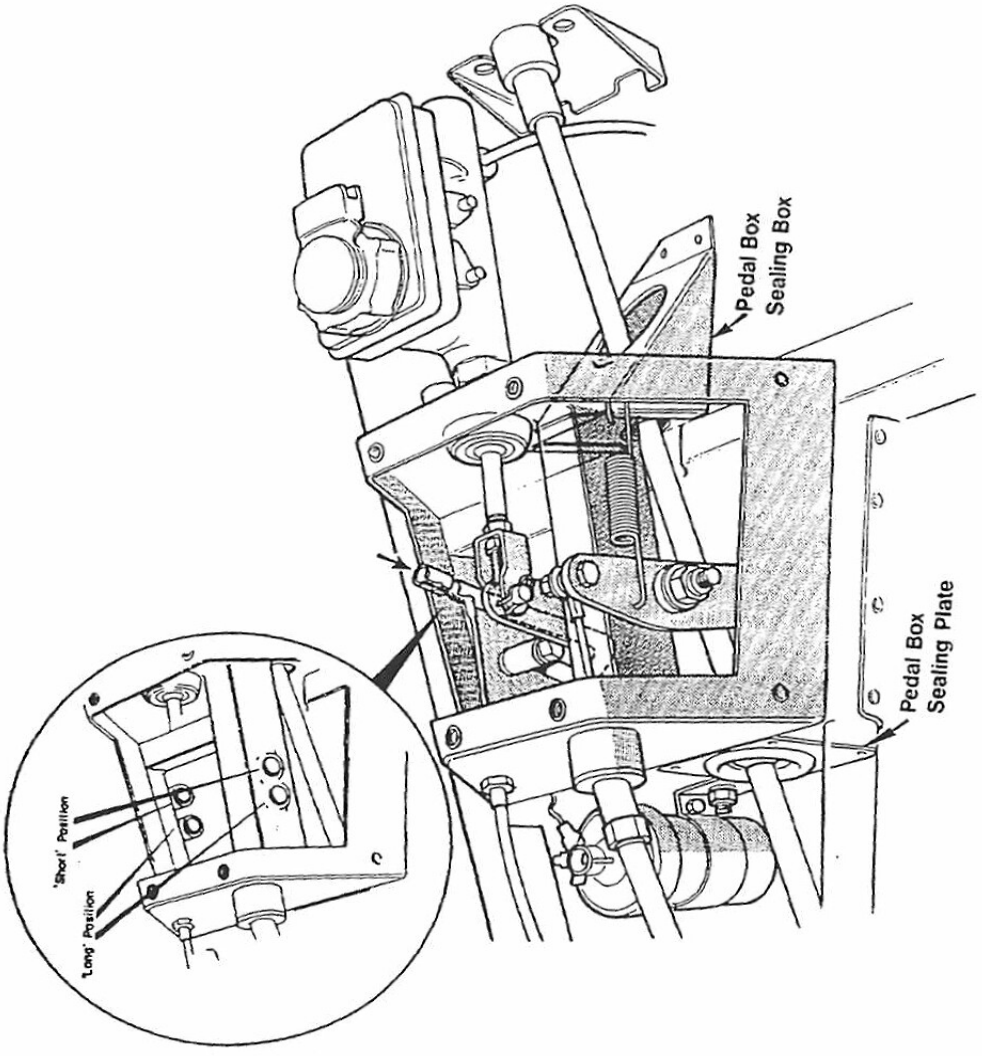


Figure 3.2 Pedal Box Assembly

v) The clutch pedal can now be levelled up to the brake pedal by adjustment at the bellhousing.

vi) Finally the throttle pedal pivots around its mounting bolt. This bolt is screwed into the front mounting bush of the two provided in the chassis.

vii) In order to level the throttle with the brake and clutch it may be necessary to move the bolt to an alternative mounting point. The threaded portion of the throttle cable can then be adjusted to take up any lost movement in the pedal. Please note that this adjustment facility is not available on Vauxhall injection cars.

viii) The pedal box lid can now be replaced and the eight fixing screws properly tightened.

3.3 Security

The Seven is provided with two keys, one for the petrol filler cap and one for the ignition switch which also operates the steering lock. The sidescreens are not fitted with any kind of lock, although the fastenings are intended not to be obvious to a potential thief.

As an additional deterrent, it is possible to fit a battery isolator switch with a removable key, though this is intended primarily to comply with motor sport regulations. Suitable switches complete with fitting kits are available from Caterham Cars.

Also available is a quick release steering wheel system, however this prevents the steering lock from operating.

Caterham Cars are able to arrange for a Vecta immobiliser to be fitted to your car at the factory, alternatively customers wishing to fit a proprietary alarm system should contact the factory who can advise on installation.

3.4 Weather equipment

Erecting the hood can be difficult if the correct procedure is not followed, therefore we recommend that the following sequence is adopted:-

i) Slacken the spare wheel in its carrier. (this is not required with some wheel/tyre combinations)

ii) Erect the hoodsticks, with the hoodstraps slackened off.

iii) Unfold the hood and clip it onto the windscreen first.

iv) Stretch the rear of the hood over the back of the car and clip it over the poppers situated on the backpanel starting at the outside and working into the centre.

v) Attach to the remaining poppers on the sides of the vehicle.

vi) From the inside of the car tension the hood with the hoodstrap adjusting buckle to pull the front hoodstick into line with the hood seam. (see diagram 3.4A)

vii) The hoodsticks should now be captured by the velcro lined strips inside the hood which prevent the hood from ballooning at speed. (increased visibility hood only)

viii) The tops of the sidescreens tuck under the flaps on the hood sides in order to make the hood watertight. At the rear, however the sidescreens overlap the hood.

ix) Finally tighten the spare wheel on its carrier. It is important that the hood is folded correctly when removed in order to avoid unsightly creases and prevent the clear plastic windows being scratched. We suggest that it is always folded according to the diagram 3.4B.

3.5 Cleaning The Seven

Painted Sevens can be cleaned and polished in the same way as any other car, though care should be taken to avoid using cloths or sponges contaminated with oil or abrasive dirt. Cars finished in natural aluminium are best cleaned using Solvol Autosol metal polish available from any good car accessory shop or Caterham Cars. Hood and sidescreen windows are very vulnerable to scratching and therefore should be cleaned with a non-abrasive soap and water only, taking care to rub very gently with a soft cloth.

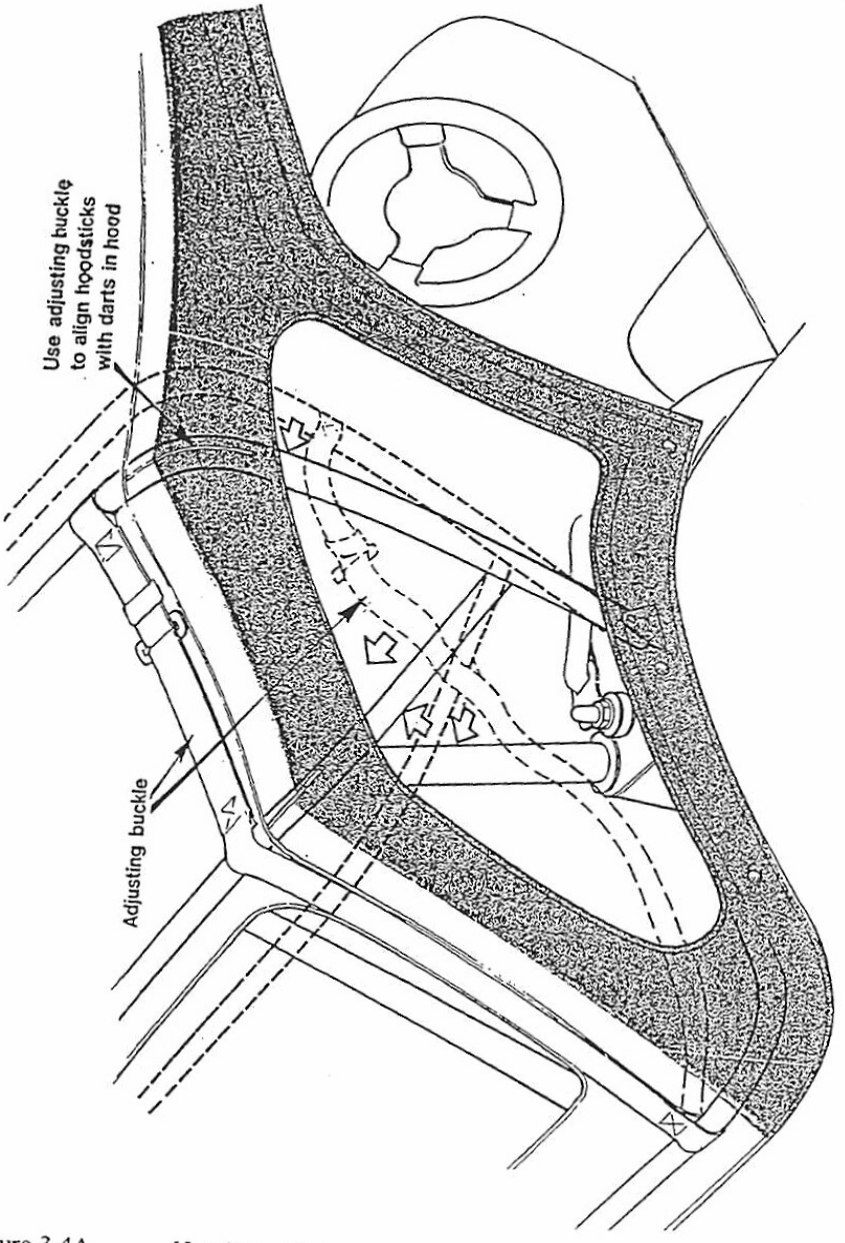
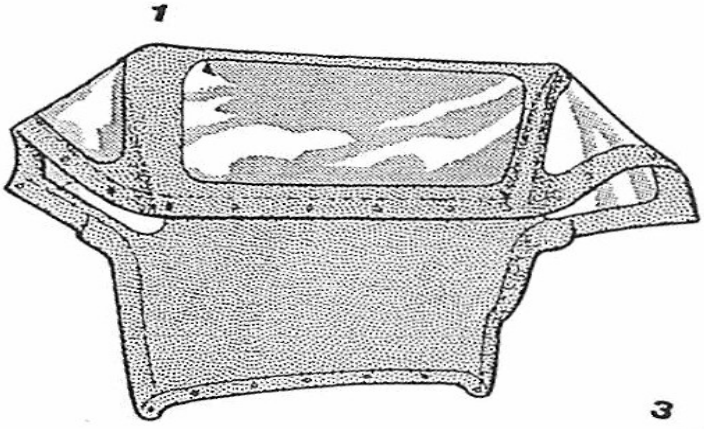
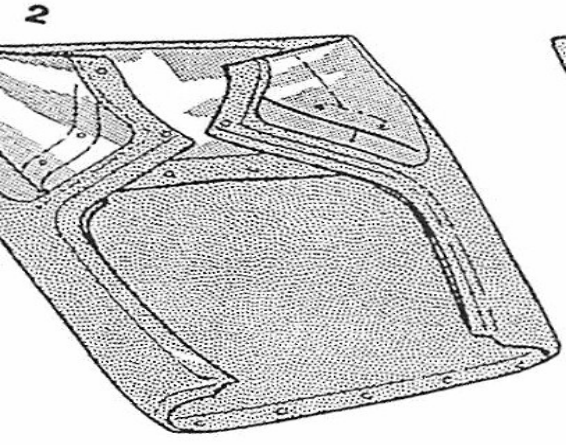
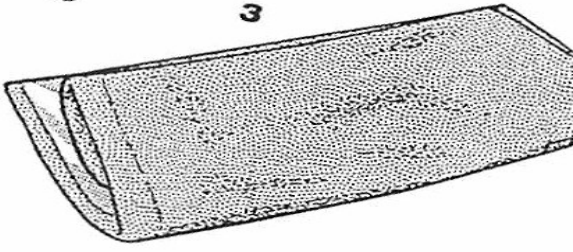


Figure 3.4A Hood Erection







Folding the Hood

3.6 Starting and Driving Away

1) Starting from cold (Weber carburettors)
No variants of the Caterham Seven are fitted with a choke or cold start mechanism as with the design of carburettors used such a device is not necessary. Starting from cold the following procedure should be adopted:

i) Pump the accelerator pedal 3-4 times.
ii) Turn the ignition key to operate the starter.
iii) When the engine fires, catch it with the accelerator and blip the engine a few times until it idles.
iv) If the engine fails to fire, pump the accelerator twice more and try again.

2) Starting from hot (Weber carburettors)
Starting from warm it should only be necessary to depress the accelerator pedal to about one quarter travel and operate the starter. Should the car have been left for a while it may be necessary to apply a pump or two on the accelerator to prime the engine sufficiently. Avoid pumping the accelerator too often as it is possible that the engine can become flooded and will not fire. In this situation depress the accelerator fully to the floor and hold it there while operating the starter. This way the excess fuel is drawn through the engine until the right mixture is achieved at which point the engine will start.

3) Starting Injected Cars
All injected cars will start directly from turning the key, although a Vauxhall may churn over shortly before firing. It is not necessary to touch the throttle pedal.

4) Driving away
It is very important with any car engine, and particularly so with an engine in a high state of tune, that it is not asked to deliver its full performance until operating temperature has been reached. Do not therefore use full throttle, high revolutions or allow the engine to labour until the temperature gauge has reached around 75 degrees (Ford engines) or 90 degrees (Vauxhall or Rover).

The rev counter is not fitted with a red warning zone, but with all Ford engines, never exceed 6750 rpm and avoid continuous use of over 5500 rpm if premature engine wear is to be avoided. Vauxhall carburettor engines are rev-limited to 7500 rpm and there is no restriction on sustained high revs. Rover engines and Vauxhall injected engines are rev-limited to 6800 rpm and again are able to withstand sustained high revs, as is a Rover Supersport which is limited to 7600rpm, with a shift light operating at 7400rpm.

3.7 Fuel and Lubrication

All Ford based engines prepared by the Caterham factory are designed and tuned to run on unleaded fuel. We recommend however, that to ensure adequate upper cylinder lubricant during the engine's life, one tankful in five should be leaded and that particular care be taken to ensure the valve clearances are correctly adjusted at 3000 mile intervals. Cosworth BDR engines must only be run on leaded 4 star fuel, while Vauxhall 16 valve and Rover "K" Series units run on unleaded or super-unleaded without the need for occasional 4 star. Rover Supersport engines must run on unleaded only. (See section 3.8 for details on catalyst equipped cars)

Engine, gearbox and differential/rear axle oil levels should be filled or topped up as follows

APPLICATION	VISCOSITY	VOLUME (L)
Ford engine	SAE 15W/40	3.3
Vauxhall & Rover engine	SAE 5W/50	4.0
Gearbox - 4 speed	EP80 gear oil	0.9
Gearbox - 5 speed	* see below	1.9
Gearbox - 6 speed	* see below	1.9
Differential (De Dion)	EP90 gear oil	0.9
Axle (Marina/Ital)	EP90 gear oil	0.7
Brake Fluid	SA3J 1703f DOT 4	as reqd.

* 5 and 6 speed gearboxes use Ford oil, part number 5015547, alternatively EP80 gear oil may be used

Caterham Cars use and recommend BP lubricants especially Visco 2000 Engine Oil

3.8 Exhaust Emission Control

Rover and Vauxhall powered cars fitted with a catalytic converter require certain precautions to be taken if damage to the converter or to the car is to avoided during use.

a) WARNING: since the converter can reach very high temperatures during use avoid parking the car where the exhaust can contact long dry grass or other combustible material as there is a risk of ignition.

b) NEVER use leaded fuel

c) DO NOT leave the engine running with the car unattended at any time.

d) DO NOT switch off the engine when running above fast idle speed.
e) DO NOT continue to operate the car if an the engine is running incorrectly, have the car checked by a Rover dealer or Caterham Cars.
f) DO NOT operate the car if it is burning oil (blue smoke from the exhaust).
g) DO NOT tow or push start the car as unburnt fuel may damage the converter.
h) DO NOT fit spark plugs other than those recommended.

3.9 Running In Instructions

Running in should be carried out as follows

Ford Engines:

MILEAGE	MAX REVS	NOTES
0-100	3500	No labouring
100-300	4000	No labouring
300-500	4500	No labouring
500-1000	6000 (occasional)	Build up revs steadily, avoid labouring

Vauxhall and Rover Engines:

0-600 miles 4000 Max revs No labouring

At 500 miles (800 kilometres) the initial service should be carried out.

To ensure correct bedding in of Ford engines use LEADED fuel for the first 500 miles (800 kilometres) and do not use a high performance synthetic oil such as Mobil 1 which lubricates so well that it prevents the bedding in process from occurring properly. Rover and Vauxhall engines can be run in with synthetic oil and must use unleaded fuel. At 500 miles the initial service should be carried out as per the instructions in Section 4.

3.10 Wheel Changing

All Sevens are provided with a tool kit which includes a scissor type jack and a wheel brace. In the event of a puncture, the wheel nuts on the offending wheel should first be loosened and then the car jacked up using only the approved jacking points which are as follows.

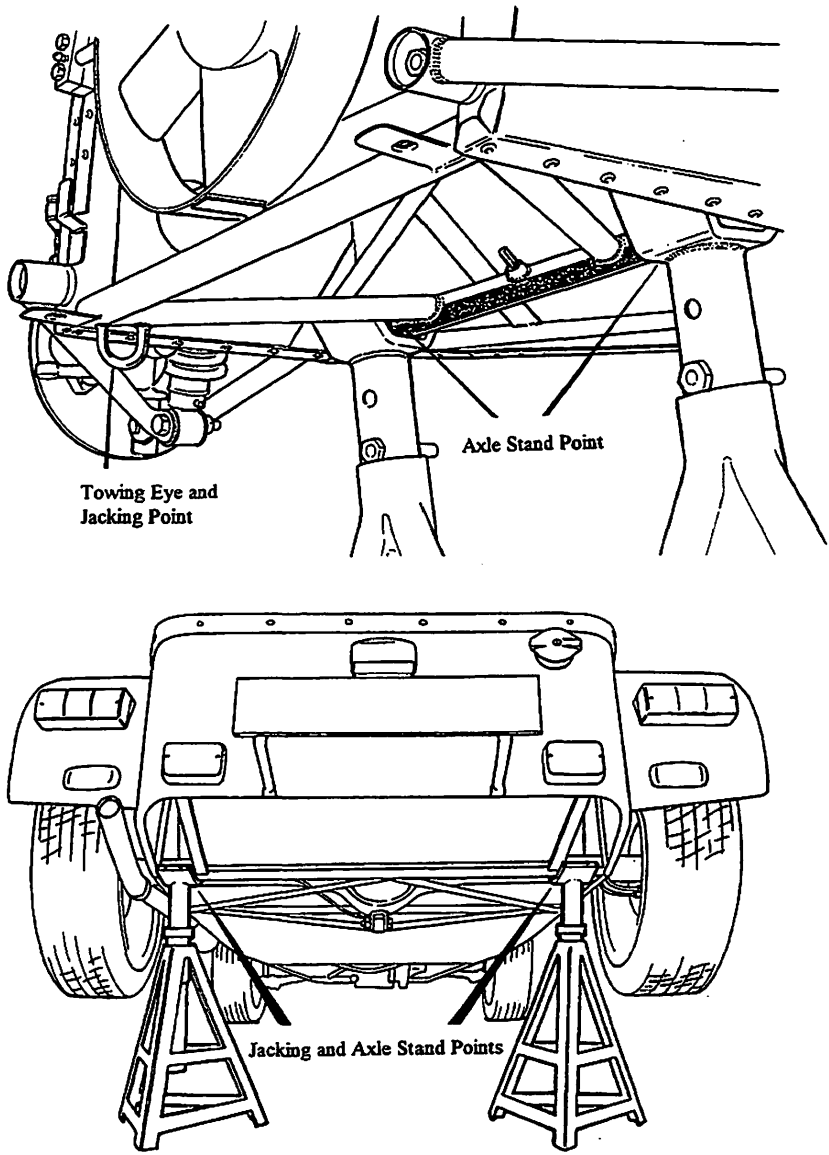


Figure 3.10 Axle Stand / Jacking Poimts

Front: Under the crossmember immediately forward of the engine or under the towing eye at the offside front of the chassis.
Rear: Under the main chassis tubes just in front of the rear wheels or under the De Dion tube.

Should any major work be carried out under the car axle stands should be located at the points shown in Figure 3.10. When replaced ensure that the wheelnuts are fitted correctly and sufficiently tightened to 55 lbft.

3.11 Laying Up For The Winter

Many owners do not use their cars during the winter months which can cause some problems when a car comes to be re-used. If a car is not intended to be used for some months then the following laying up procedure is strongly recommended since it will prevent deterioration which could otherwise occur.

i) To prevent the tyres from going out of round by being left in one position carrying the weight of the car, they should be inflated to around 40 psi or ideally the car should be supported on blocks with its wheels clear of the ground. The handbrake should be left off and, if left on its wheels, the car securely chocked.

ii) Ensure that the cooling system is filled with the correct antifreeze mixture which should be a 1:2 ratio of fresh antifreeze to water (approx 2.5 pints or 1.5 litres antifreeze). Do not drain the cooling system as the fluid prevents internal corrosion.

iii) Remove the spark plugs and pour a drop of engine oil down each bore. Cover the plug holes with a cloth, and turn the engine over on the starter for about 20 seconds to thoroughly coat the inside of the cylinder bores, and replace the spark plugs. This will prevent both corrosion of the cylinders and the piston rings sticking to the bores. However when restarted the engine will blow this out as smoke for the first few minutes. This is not really necessary with a modern 16 valve engine.

iv) To prevent the clutch from jamming to the flywheel, wedge the clutch pedal in the fully disengaged position with a length of wood against the cross-member in front of the seat.

v) Disconnect the battery. If the car is to remain disused for more than three months keep the battery charged using a trickle charger. If a Torque Starter

battery is allowed to become fully discharged (below 8.5 volts) owners may have difficulty in getting it to accept a charge again.

vi) Petrol will deteriorate over time and lose its Octane rating. Take care to avoid using full throttle until the old fuel has been consumed.

vii) Erect the hood to ensure that the windows do not become creased and cover the car with a dust cover to prevent a layer of abrasive dust accumulating which could scratch the hood windows when wiped away, tailored covers are available from Caterham Cars.

viii) If left in a damp atmosphere, unpainted aluminium can tarnish or corrode, so we recommend that any exposed aluminium be coated with "Waxoyl" or equivalent. This will take time to remove but will protect the car well. Alternatively, WD40 is less effective but much easier to remove.

When removing the car from storage it is very important to check all the cars functions before use. In particular, remove the spark plugs and turn the engine over on the starter motor to ensure that the oil is properly circulated and pressure is indicated on the gauge before trying to start the engine. Take particular care to check the tyre pressures, especially if they have been left at high pressure to prevent distortion.

3.12 Warranty Terms

The warranty provided with a new Caterham Seven is in accordance with the guidelines laid down by the Specialist Car Manufacturer's Group of the Society of Motor Manufacturers and Traders. Caterham Cars assures the customer that if any part becomes defective due to faulty manufacture or materials within 12 months of the date of delivery of the vehicle, it will be repaired or replaced free of charge. It is the customers responsibility to deliver his vehicle to and subsequently collect from Caterham Cars Ltd's factory at Unit 2, Kennet Road, Dartford, Kent. This Warranty is subject to the following conditions:

i) The defect must be notified to Caterham Cars Ltd before any repair under the warranty or replacement is undertaken.

ii) The vehicle must not have been misused, modified or used for motor sport.

iii) The vehicle must be maintained in accordance with the schedules set out in Section 4 of this manual

iv) The vehicle must have been completed in accordance with the instructions set out in Section 2 of this manual, or when referring to a CKD vehicle, assembled in accordance with the instructions set out in the Assembly Guide, using the correct recommended parts. The warranty does not apply to any part

not supplied by Caterham Cars Ltd nor to any colour variation or fading to self pigmented colours or metallic paint.

vi) The warranty is only effective if the warranty schedule is signed and returned by the purchaser at the time of delivery.

vii) The benefits under this warranty do not adversely effect the consumer's remedies under statute and are additional to any rights conferred by the Sale of Goods Act. In the event of any dispute arising as to the interpretation of this warranty it may, if the customer prefers, be decided by an independent arbitrator, to be nominated by the SMMT.

viii) Any change in ownership of the vehicle must be notified in writing to Caterham Cars Ltd.

ix) The customer must acknowledge receipt of the SMMT Specialist Car Manufacturer's Group Safety Handbook.

SECTION 4

SERVICE INFORMATION

To ensure safety and component longevity and to maximise the enjoyment of your Seven, it is very important that the recommended servicing procedures are carried out correctly.

It is of course possible to return your car to Caterham Cars for servicing, but for those who wish to carry out their own maintenance the following instructions cover all routine operations. We strongly advise, from a safety point of view, that if you have any doubts concerning safety related components - ie. brakes, steering etc - that you seek professional advice. If, having followed these instructions, your car is still not performing correctly, please contact Caterham Cars at Dartford or go to a professional for assistance.

Before commencing work on your car, please take note of the following:-

WARNING

a) Never work underneath a car without supporting it on axle stands or equivalent. Do not rely on a jack alone.

b) The electric radiator cooling fan is controlled by a thermostat which operates when the ignition switch is in the on position. If you are working in the vicinity of the fan with a hot engine we recommend that the ignition is switched off before starting work.

c) Cars fitted with electronic ignition systems have much increased voltages compared with conventional systems and there is a real danger of electric shocks if you work on the system with the ignition on, particularly in damp conditions. The ignition should be switched off before touching any part of the ignition system.

d) The cam drive belt on BDR engines is exposed therefore take extreme caution when working with the engine running.

e) Used Engine Oils - Health Warning

i) Prolonged and repeated contact may cause serious skin disorders including dermatitis and skin cancer.

ii) Avoid contact with the skin as far as possible and wash thoroughly after any contact.
iii) Keep out of reach of children.

f) Used Engine Oils - Protect the Environment
It is illegal to pollute drains, water courses and soil. use authorized waste collection facilities including civic amenity sites and garages providing facilities for disposal of used oil and used oil filters. If in doubt, contact your local authority for advice on disposal.

4.1 Service Schedules

On the following pages are listed the operations to be carried out at each service, whether the initial 500 miles, 3,000 miles, 6,000 miles, 12, 000 miles or the equivalent intervals thereafter. Also included is a list of the points checked in the course of a post build check for a kit or component car. Due to the nature of their injected engines and more modern specification, it is not necessary for Rover or Vauxhall injection cars to have services at 3,000 mile intervals.

Each operation is covered in detail under the following sections 5 to 9 which follow and the appropriate reference is included in the service schedule. These schedules are followed by a service parts list comprising the normal replacement items used during service operations. Where possible, part numbers are also given in the text of the service instructions.

The text of the service instructions may appear a little basic to someone who has just constructed the car from a kit but it is also aimed at subsequent owners who may lack the same skills. The instructions contained in section 6 covering engine maintenance relate to Caterham supplied Ford based engines. Generally they will apply to all Ford crossflow engines but we do recommend that you check with the actual engine builder for tuning information.

Cosworth BDR engines are very much more complicated than the Ford engines upon which they are based and we strongly recommend that these are maintained professionally. These instructions do not therefore cover operations such as valve clearance adjustment and timing belt replacement on these engines.

The Vauxhall 2.0 litre and Rover K Series 16 valve DOHC engines require significantly less maintenance than the Fords and the necessary instructions are contained in sections 6 and 7.

4.2 Overhaul of Major Mechanical Components

The strip and rebuild of the major mechanical components is outside the scope of the guide. It is suggested that the relevant Haynes manual is purchased.

4.3 Electrical problems

At the rear of the Service section you will find a wiring diagram with an appropriate key and also a diagram showing the layout of the fuse box. See Section 10 for fault diagnosis.

4.4 POST BUILD CHECK - CATERHAM SUPER SEVEN

The post build check consists of the following operations:-

LUBRICATION

1) Check Engine, Gearbox and Rear Axle oil levels, check for leaks and report.

ENGINE

2) Check hose connections and radiator level.
3) Check security of engine mountings and exhaust system.
4) Check security of oil cooler hoses and ensure they do not chafe on chassis, suspension or radiator.

CLUTCH

5) Check correct adjustment and operation of clutch and ensure that cable is free to pivot on end of pedal.

BRAKES

6) Check braking system for operation and correct adjustment.
7) Check brake hydraulic lines for security and leaks ensure that De Dion axle pipe does not foul the differential.
8) Check brake fluid reservoir level.
9) Ensure any faults are rectified before road test.

STEERING AND SUSPENSION

10) Check all front and rear mounting bolts for tightness.
11) Check and adjust tyre pressures and wheel nut tightness.
12) Check security of all steering connections.
13) Check that steering rack mountings are secure.
14) Check front wheel alignment.

ELECTRICAL SYSTEM

15) Check headlamp adjustment.
16) Check operation of all circuits.
17) Check that battery and terminals are secure.

BODY

18) Check weather equipment.
19) Check security of front and rear wings.

GENERAL

20) Road test and report on any defects found

4.5 CATERHAM SEVEN SERVICE OPERATIONS

BODY AND CHASSIS

MILES	500	3000 *	6000	12000
KILOMETERS	800	5000 *	10000	20000
MONTHS	INITIAL SERVICE	3 *	6	12
Brake fluid level	Check	Check	Check	Check
Screen washer level / operation	Check	Check	Check	Check
Tyre conditions and pressures	Check	Check	Check	Check
Suspension security	Check		Check	Check
Horn operation	Check		Check	Check
Check wheelbearing endfloat	Check		Check	Check
Brake hoses, pipes & unions	Check			Check
Wheel nut torques	Check			Check
Lights and bulbs	Check			Check
Wheel alignment	Check			Check
Switchgear	Check			
Headlight alignment	Check			
A frame bush		Check	Check	Check
Wiper condition and operation		Check	Check	Check
Handbrake operation			Check	Check
Brake pads & discs			Check	Check
Steering joints and gaitors			Check	Check
Lubricate trunnions			Yes	Yes
CV gaitors			Check	Check
Seatbelt security & operation				Check
Repack wheelbearings				Yes
Damper operation				Check
Check battery connections & condition				Check

Further operations :-

Replace brake fluid at 24,000 miles or 24 months
Replace coolant at 24,000 miles or 24 months
Replace brake hoses at 3 years

* Rover and Vauxhall injection cars will not need a 3,000 mile service

ENGINE AND DRIVETRAIN

MILES	500	3000 *	6000	12000
KILOMETERS	800	5000 *	10000	20000
MONTHS	INITIAL SERVICE	3 *	6	12
Engine Oil	Change	Change	Change	Change
Oil filter	Change		Change	Change
Ignition timing (Ford)	Check		Check	Check
ECU diagnostics	Check			Check
Gearbox oil level	Check			Check
Differential / axle oil level	Check			Check
Fuel lines	Check			
Cylinder head bolts	Check			
Carburettor balance & idle settings	Check	Check	Check	Check
Coolant level / strength	Check	Check	Check	Check
Alternator drive belt	Check	Check	Check	Check
Coolant hose condition & security	Check			Check
Foam sump baffle (16V wet sump)			Change	Change
Spark plugs			Check	Change
Clutch action / cable adjustment			Check	Check
Tappet clearance (Ford)			Adjust	Adjust
Air filter (Injection)				Change
PCV valve (Ford GT only)				Change
Exhaust security				Check
Engine Mountings				Check

Further operations :-

Clean K&N filters at 30,000
Replace BDR Cambelt at 24,000 miles or 24 months
Replace Vauxhall Cambelt at 24,000 miles or 5 years
Replace Rover Cambelt at 60,000 miles or 5 years
Injection fuel filter 24,000 miles or 24 months
Inspect fuel lines at 24,000 miles or 24 months

* Rover and Vauxhall injection cars will not need a 3,000 mile service

4.6 SERVICE PARTS

Description	Application	Part Number
Oil Filter	Ford	GFE 148
	Vauxhall	GFE 210
	Rover	GFE 171
Air Filter	Ford 1600 GT	PF125
	40 & 45 Webers	KN56-135
	48 Webers	KN56-1710
	Injected - air box	GFE1141
	Injected - K&N	RU1480
Fuel Filter	Injection cars	GFE7020
Spark Plug	Ford 1600	BP7ES
	Ford 1700 & BDR	B8ECS
	Vauxhall	90442210
	Rover (standard)	GSP6662
	Rover Supersport	BCP7ES or GSP6662
Distributor Cap	Bosch v/entry	EDH24
	Bosch side entry	4580-B
	Lucas v/entry	DDB108
	Lucas side entry	DDB194
	Vauxhall >1993	90297426
	Rover	GDC377
Rotor arm	Lucas points	DRB101
	Lucas electronic	DEB100
	Bosch points	EDR109
	Bosch electronic	DEB118
	Vauxhall	90008612
	Rover	GRA2285
Points	Bosch	EDP38
	Lucas	DSB101
	Lucas (BDR)	DSB108
Condenser	Lucas	DCB101
	Bosch	EDC188
Vane Switch	Electronic ignition	DPB100
Spark plug Lead	Vauxhall (set of 5)	90358065
	Rover (set of)	GHT260
	Ford (1)	71224
	BDR (1)	PP5130
Coil lead	Ford RHD	71024
	Ford LHD	DHB328

Coil Lead (cont.)	Vauxhall Rover BDR	90338160 NGC10089 PP3355
Coil	Ford Vauxhall >1993 Rover	DLB101 90320586 ADU8779
Alternator belt	Ford RHD Ford LHD Vauxhall RHD Vauxhall inj. LHD Vauxhall carb. LHD Rover	QBA762 QBA788 QBA788 QBA875 QBA887 GFB80750
Timing belt	BDR Vauxhall Rover	PP0950 90280404 GTB1238
Rocker cover gasket	Ford	1421437
Cam Cover Gasket	BDR Vauxhall Rover	BA0608 90298154 Re-usable
Sump Gasket	Vauxhall Rover	90411386 Re-usable (A3 91 004)
Foam baffle - sump	Vauxhall Rover	70200 72119
Front brake pads	De Dion (std) De Dion (A.P. 4 pots) Live axle	GD533-F3441F 77189 GD533-F3434F
Rear brake pads	De Dion (std) De Dion (A.P. 2 pots)	FDB398-F3460 77190
Rear brake shoes	De Dion Live axle (Ital)	338136 MGR36

LAYOUT OF FUSE BOX - ALL MODELS

		FUEL PUMP - 15A INJECTION ONLY	E.C.U. - 20A INJECTION ONLY
BRAKE & REVERSE LIGHTS - 15A	HEATER & INSTRUMENTS - 10A	WIPERS & WASHERS - 15A	COOLING FAN - 15A
HEATED SCREEN 10A	HORN 20A	INDICATORS & HAZARDS - 10A	FOGLIGHTS 5A
DIP BEAM 15A	MAIN BEAM 15A	LH SIDE & TAIL LIGHTS - 5A	RH SIDE/TAIL LIGHTS & INSTRUMENTS 7.5A

IGNITION MODULE RELAY (POST 93 VAUXHALL WITH CARBS ONLY)	HORN RELAY	HAZARD RELAY
	FLASHER UNIT	LIGHTS RELAY

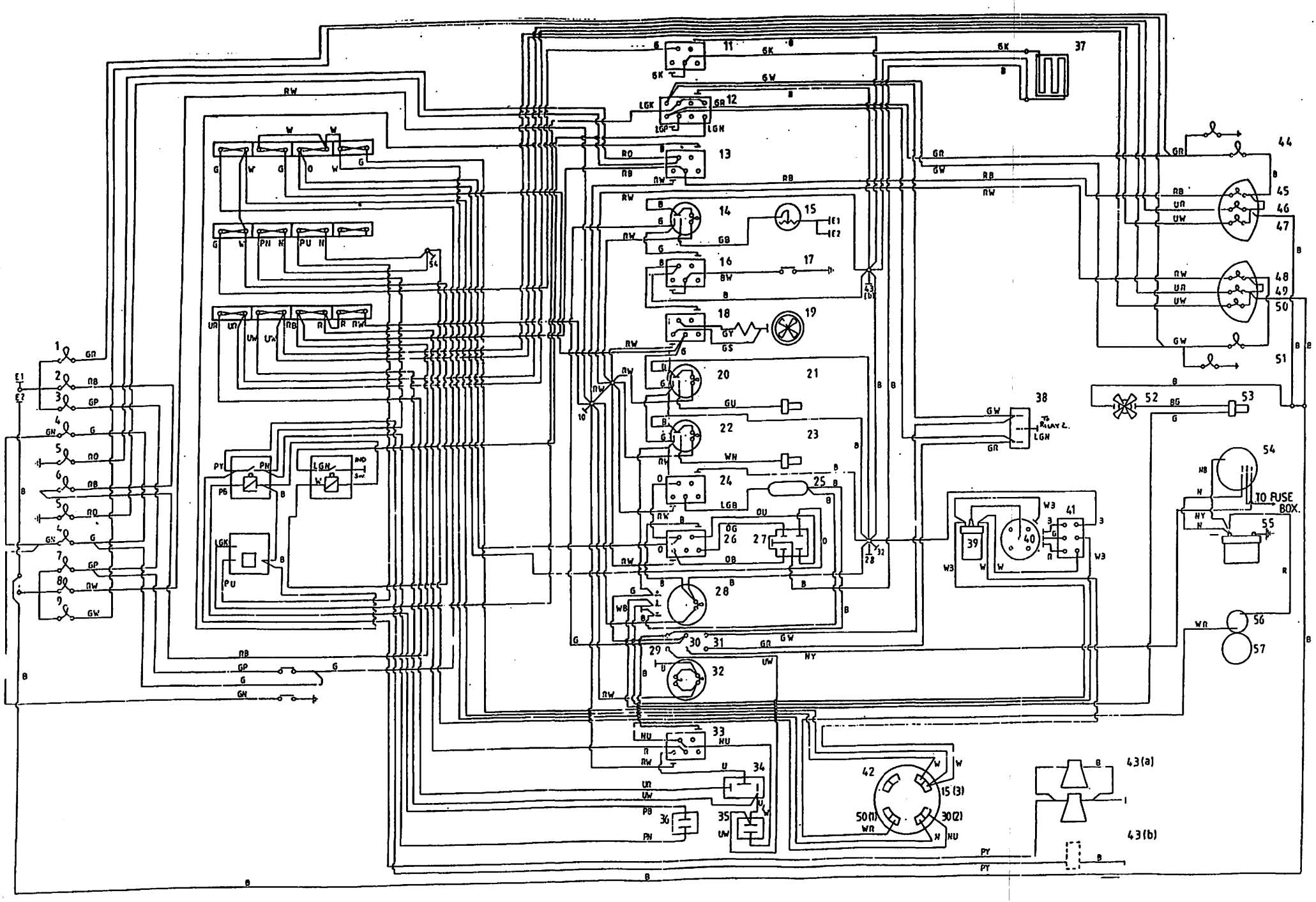
WIRING DIAGRAM COLOUR CODE

N	BROWN	G	GREEN
B	BLACK	LG	LIGHT GREEN
U	BLUE	K	PINK
R	RED	W	WHITE
O	ORANGE	Y	YELLOW
P	PURPLE	S	SLATE

Figure 4.1 Fuse Box layout - All Models

Key to Wiring Diagram - Ford Engine

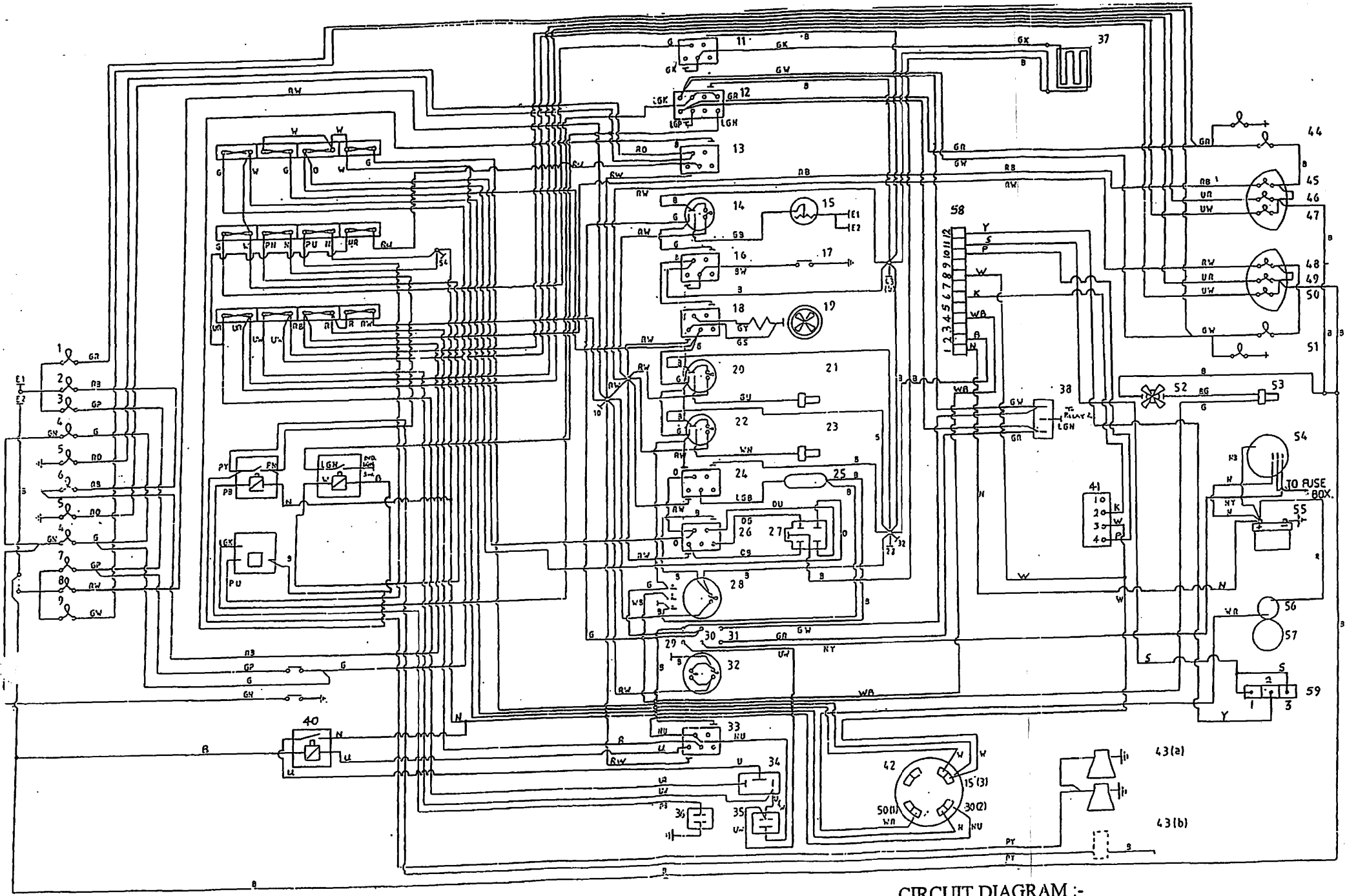
1	LH Indicator
2	RH Rear Lights
3	LH Brake Light
4	Reversing Light
5	Fog Light
6	Number Plate Light
7	RH Brake Light
8	RH Rear Light
9	RH Rear Indicator
11	Heated Screen Switch
12	Hazard Switch
13	Rear Fog Switch
14	Fuel Gauge
15	Fuel Gauge Sender
16	Brake Test Switch
17	Brake Fail Switch
18	Heater Switch
19	Heater Fan
	GY Slow
	GS Fast
20	Water Temperature Gauge
21	Water Temperature Sender
22	Oil Pressure Gauge
23	Oil Pressure Sender
24	Washer Switch
25	Washer Motor
26	Wiper Switch
27	Wiper Motor
28	Tachometer
29	Main Beam Warning Light
30	Ignition Warning Light
31	Indicator Warning Light
32	Speedometer
33	Lights Switch
34	Dip Switch
35	Headlamp Flash Switch
36	Horn
37	Heated Front Screen
38	Indicator Switch
39	Coil
40	Distributor
41	Ignition Amplifier
42	Ignition Switch
43	(a) Electric Horns
	(b) Air Horns (option)
44	LH Front Indicator
45	LH Side Light
46	LH Dipped Beam
47	LH Main beam
48	RH Side Light
49	RH Dipped Beam
50	RH Main Beam
51	LH Front Indicator
52	Radiator Fan
53	Radiator Fan Switch
54	Alternator
55	Battery
56	Starter Solenoid
57	Starter Motor



CIRCUIT DIAGRAM :-
FORD POWERED CATERHAM SEVEN

Key to Wiring Diagram - Vauxhall Carbs

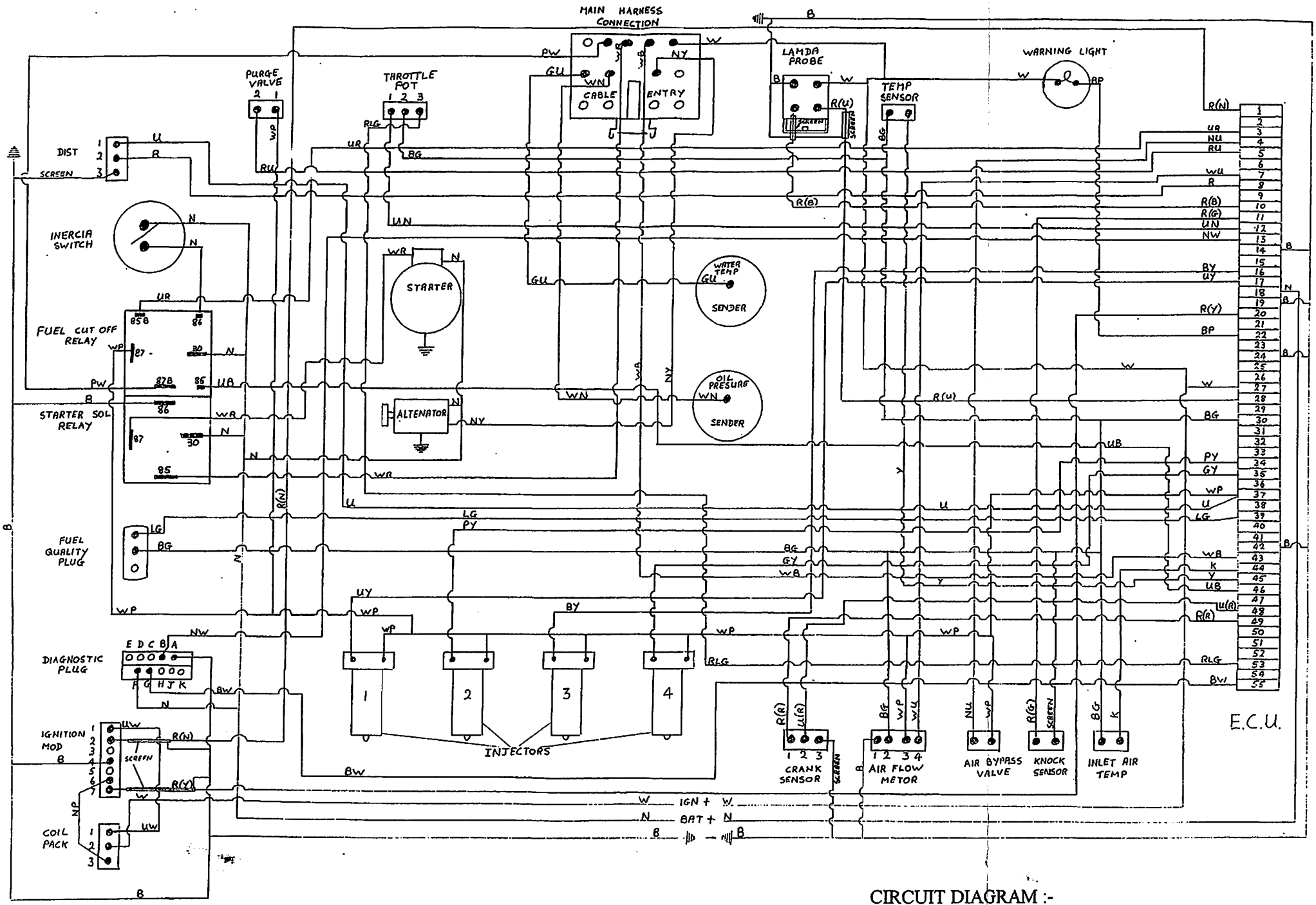
1	LH Indicator	30	Ignition Warning Light
2	RH Rear Lights	31	Indicator Warning Light
3	LH Brake Light	32	Speedometer
4	Reversing Light	33	Lights Switch
5	Fog Light	34	Dip Switch
6	Number Plate Light	35	Headlamp Flash Switch
7	RH Brake Light	36	Horn
8	RH Rear Light	37	Heated Front Screen
9	RH Rear Indicator	38	Indicator Switch
11	Heated Screen Switch	40	Headlight Relay
12	Hazard Switch	41	Coil Pack
13	Rear Fog Switch	42	Ignition Switch
14	Fuel Gauge	43	(a) Electric Horns
15	Fuel Gauge Sender		(b) Air Horns (option)
16	Brake Test Switch	44	LH Front Indicator
17	Brake Fail Switch	45	LH Side Light
18	Heater Switch	46	LH Dipped Beam
19	Heater Fan	47	LH Main beam
	GY Slow	48	RH Side Light
	GS Fast	49	RH Dipped Beam
20	Water Temperature Gauge	50	RH Main Beam
21	Water Temperature Sender	51	LH Front Indicator
22	Oil Pressure Gauge	52	Radiator Fan
23	Oil Pressure Sender	53	Radiator Fan Switch
24	Washer Switch	54	Alternator
25	Washer Motor	55	Battery
26	Wiper Switch	56	Starter Solenoid
27	Wiper Motor	57	Starter Motor
28	Tachometer	58	ECU
29	Main Beam Warning Light	59	Crank Sensor



CIRCUIT DIAGRAM :-
CATERHAM SEVEN WITH VAUXHALL
ENGINE WITH CARBS (PRE 1993 ENGINE)

Key to Wiring Diagram - Injected Cars, Main Loom

1 LH Indicator
2 RH Rear Lights
3 LH Brake Light
4 Reversing Light
5 Fog Light
6 Number Plate Light
7 RH Brake Light
8 RH Rear Light
9 RH Rear Indicator
11 Heated Screen Switch
12 Hazard Switch
13 Rear Fog Switch
14 Fuel Gauge
15 Fuel Gauge Sender
16 Brake Test Switch
17 Brake Fail Switch
18 Heater Switch
19 Heater Fan
GY Slow
GS Fast
20 Water Temperature Gauge
21 Oil Warning Light Switch
22 Oil Pressure Gauge
23 Oil Pressure Warning light
24 Washer Switch
25 Washer Motor
26 Wiper Switch
27 Wiper Motor
28 Tachometer
29 Main Beam Warning Light
30 Ignition Warning Light
31 Indicator Warning Light
32 Speedometer
33 Lights Switch
34 Dip Switch
35 Headlamp Flash Switch
36 Horn
37 Heated Front Screen
38 Indicator Switch
39 Connection To Engine Loom
40 Headlight Relay
41 Ignition Coil (Rover Only)
42 Ignition Switch
43 (a) Electric Horns
(b) Air Horns (option)
44 LH Front Indicator
45 LH Side Light
46 LH Dipped Beam
47 LH Main beam
48 RH Side Light
49 RH Dipped Beam
50 RH Main Beam
51 LH Front Indicator
52 Radiator Fan
53 Radiator Fan Switch
54 Fuel Pump
55 Battery



CIRCUIT DIAGRAM :-
ENGINE HARNESS FOR A POST
1993 VAUXHALL INJECTION ENGINE

SECTION 5

SERVICE INFORMATION - BODY AND CHASSIS

5.1 Front Brakes - Inspection and Changing Brake Pads

Jack up the front of the car, supporting it on axle stands (see figure 3.10) and remove the front wheels. Clean pad dust from the brake caliper, hub and upright and inspect front pads for wear. If there is less than 1/8" of friction material remaining the pads should be changed.

CAUTION: All Sevens are now supplied with Asbestos free brake pads. Should these be substituted with non asbestos free pads for any reason, great care must be taken to avoid inhaling pad dust.

To fit new pads, the pistons within the brake calipers will need to be pushed back and this can be done using a long screwdriver, taking great care not to damage the rubber seals around the pistons.

If the fluid level in the brake master cylinder has been regularly topped up, the resultant flow of fluid back into the master cylinder may cause it to overflow and therefore it is advisable to remove the cap from the fluid reservoir and position suitable absorbent material around it to prevent spillage.

The new pads should be pushed into place noting that the anti-squeal shims fit between the pad and the caliper piston and that the arrows stamped in the shims reflect the normal (forward) direction of rotation of the disc.

Inspect the discs for scoring, badly scored discs should be replaced as they will impair the braking performance of the car. Scoring is likely to occur if the brake pads are allowed to wear out completely causing the metal pad backplate to contact the disc.

Inspect the flexible brake hoses for any indication of splits or perishing. If in doubt these must be replaced, and in any case we recommend these be replaced periodically. (see 5.8)

The wheels can now be replaced, finally tightening the wheel nuts to 55 lb ft when on the ground. BEFORE DRIVING THE CAR, APPLY THE BRAKES WHILST STATIONARY TO PUSH THE PADS UP AGAINST THE DISC AND TAKE UP THE SLACK. Failure to do this will result in the first application of the brakes being totally ineffective.

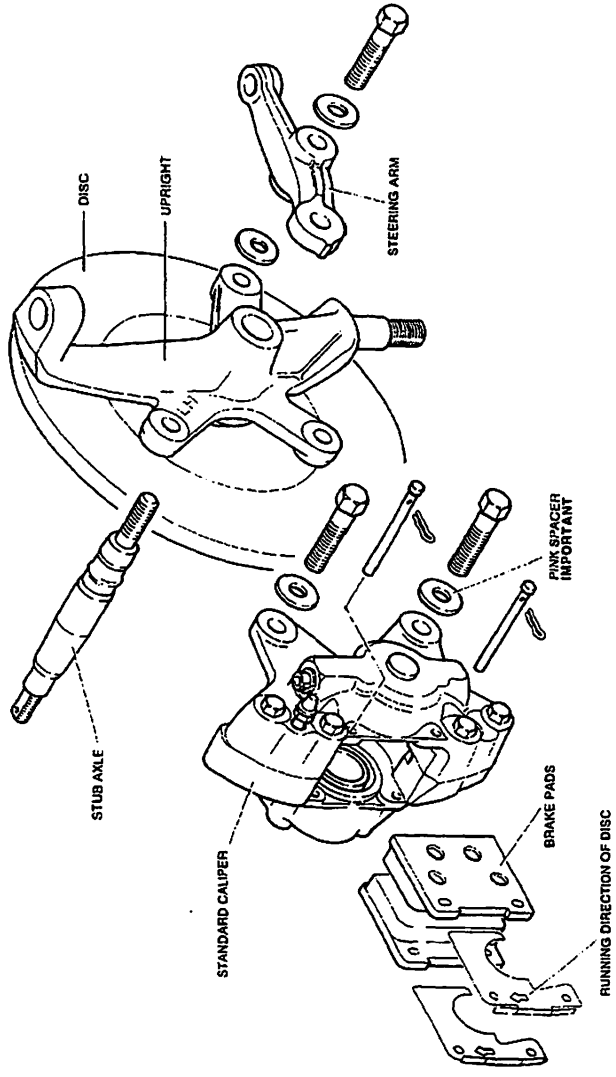


Figure 5.1 Front Upright Assembly

5.2 Brake Disc Replacement

To change the front discs, the brake caliper and front hub assembly both need to be removed. The discs should always be replaced as pairs across an axle, and new pads should always be used.

With the front of the car supported, and the wheels and brake pads removed, unbolt the brake caliper from the upright and remove. It should not be necessary to disconnect the flexible hoses if the caliper is supported such that the hoses are not strained.

Following the instructions in section 5.9 remove the hub/disc assembly, taking care to avoid dislodging any parts or allowing dirt to enter the bearings. Undo the four 5/16" bolts retaining the disc and remove the disc. After thoroughly cleaning the mating surfaces to prevent the possibility of runout, fit the new disc and bolt in place with an application of loctite and torque to 25lbft.

Whilst the hub is removed, check the wheelbearings for wear and re-grease if required. Follow the re-assemble instructions in section 5.9 and tighten the caliper bolts and castellated hub nuts to the torques given at the end of this chapter.

5.3 Rear Disc Brakes - Inspection and Changing Brake Pads

The rear of the car must be jacked up and supported by axle stands which should be located at each end of the chassis crosstube supporting the front of the fuel tank. Remove both rear wheels and clear away brake dust (see caution note 5.1).

Inspect the rear pads for wear and replace them if there is less than 1/8" of frictional material remaining. However, the normal road use service life of these pads is around 30,000 miles.

In the unlikely event that they do need changing, a special service tool is needed to push the piston back into the caliper. Both calipers and pads are sourced from the early Ford Cosworth Sierra and the special service tool (Part number 12-006) required is available through Ford dealers only who will order it on your behalf from the manufacturers. The cost of this tool is approximately £80.00 plus VAT. In the light of this it will probably be more economical to have your pads changed either by Caterham Cars or a Ford dealer, unless of course you can persuade a Ford dealer to lend or hire you the tool.

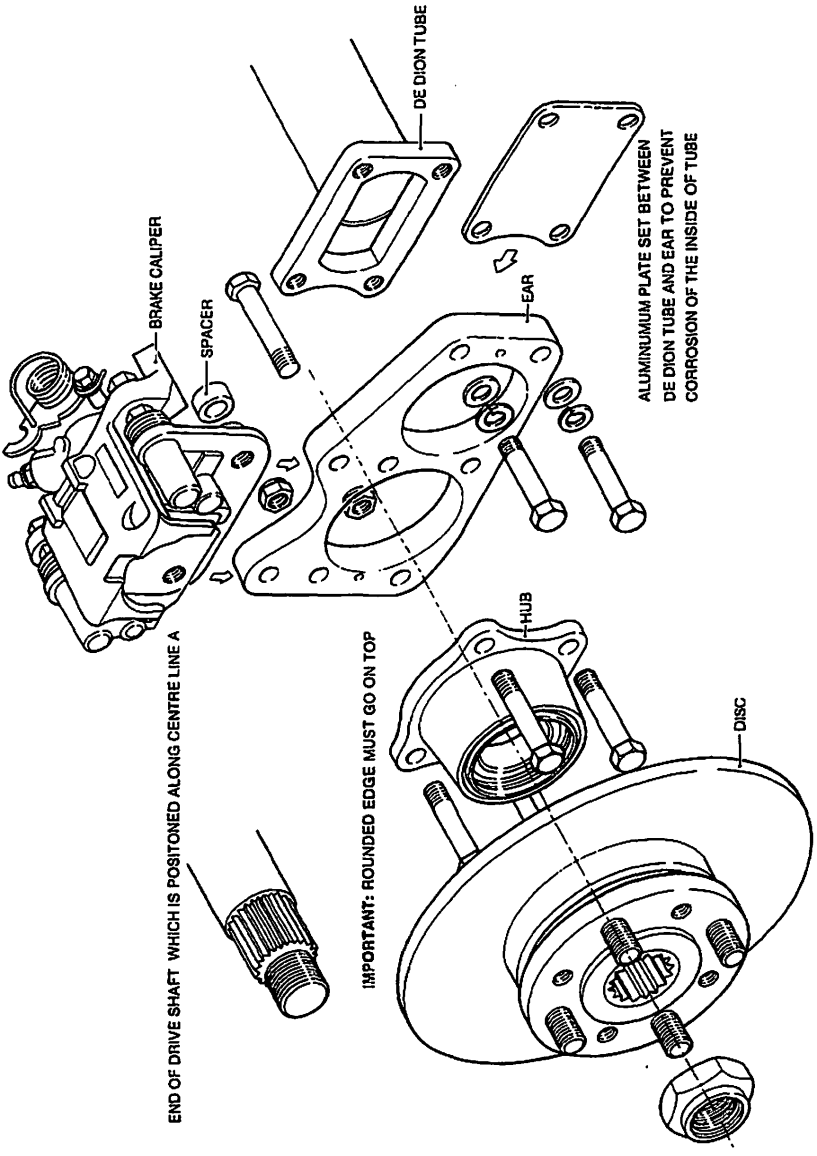


Figure 5.3 Rear Brake Disc and Hub Assembly

If you have the correct tool the pads are changed as follows:-

a) First disconnect the brake pipe from the back of the caliper.

b) Remove the bolts securing the caliper to the De Dion end plate and lift it clear of the car.

c) Remove the old pads, fit the service tool to the caliper and push the piston back into the caliper body until there is space available to fit the new, thicker pads.

d) Fit new pads and replace the caliper, apply Loctite to the 10mm x 55mm bolts and torque to 35 lb ft.

e) Rebleed the brakes (see 5.7).

5.4 Rear Drum Brakes - Maintenance and Adjustment

The rear drum brakes on Ital/Marina axled cars are not self adjusting and therefore need periodic attention.

Jack up the rear of the car, supporting it on axle stands (as in figure 3.10) and remove the rear wheels. Making certain that the handbrake is off, remove the Phillips screws holding the drums to the rear hubs and pull off the drums. These can sometimes be difficult so it may be necessary to prise them off by inserting a screwdriver between drums and backplate or by slackening off the adjuster, but take care not to use too much pressure which can bend the backplate. With the drums removed, clean out the brake dust from the drums and backplate.

CAUTION: If asbestos based shoes are fitted, take great care to avoid inhaling this dust, do not use an airline.

Inspect the brake shoes for wear or contamination with leaking fluid and replace if necessary, noting carefully the positioning of the shoes and pull off springs (which locate behind the shoes). Also check the condition of the wheel cylinders and replace should there be any sign of leakage.

1) Brake shoe replacement

a) With a pair of pliers twist the shoe retaining pins until the collets and springs are released.

b) Pull the shoes away from the adjuster end first and, after releasing the springs, remove them, noting carefully their position and orientation.

c) While the shoes are removed, slacken off the brake adjuster, checking that this moves freely, lubricating with a little grease if necessary.

d) Fit the springs, new shoes and the brake drum.

CAUTION: do not press the brake pedal whilst the brake drums have been removed.

2) Brake shoe adjustment

a) With the drums and wheels fitted, jack up the car and turn the adjuster in a clockwise direction using a proprietary square drive brake adjusting tool until the wheel is locked.

b) Slacken the adjuster until the shoes are just free of the drum. If the brakes are adjusted too tightly you will suffer loss of performance and premature shoe wear. If too slack, the brake pedal travel will be excessive.

3) Wheel cylinder replacement

a) Remove the brake drums and shoes and clean out the backplate thoroughly.

b) Disconnect the steel brake pipe from the back of the wheel cylinder and remove the bleed nipple.

c) Remove the circlip from the cylinder boss protruding through the backplate and withdraw the cylinder.

d) Replace with a new part.

e) Reassemble the shoes and drum, bleed the braking system thoroughly using the correct fluid (see 3.7) and adjust the brakes as above.

5.5 Handbrake Adjustment - De Dion Cars

The handbrake is adjusted using the nylon knurled nuts threaded onto the rear outer cable underneath the car. Firstly slacken the rearmost nut clear of the forward one. Carry out the adjustment using the forward nut and when finished screw up the rear nut to lock the front one (Figure 5.5).

Take care to ensure that it is not adjusted too tightly and that the rear pads/shoes are not binding. Ideally the handbrake should lock the rear wheels on about three clicks of the ratchet mechanism. Adjustment should be made with the rear of the car supported by axle stands so that the rear wheels can be spun by hand.

The handbrake lever is held in place by a 7/16" x 2 3/4" bolt passing vertically through the bulkhead and secured with a nyloc nut. Should the handbrake lever have worked loose, indicated by vertical play in the lever, this bolt will need to be tightened. The handbrake cover will need to be removed first, this being held in place only by the circlip around the handbrake barrel.

5.6 Handbrake Adjustment - Live Axle Cars

The handbrake is adjusted where the cable joins the strap attached to back of the axle casing on the left hand side. First however, with the handbrake released, check that there is an even amount of slack in the brake levers at each side,

adjusting the handbrake rod which runs across to the right hand brake lever from the strap as necessary. (see Figure 5.6) Ideally the handbrake should be set so that both back wheels are locked on three clicks of the ratchet. Check the security of the handbrake lever itself as in section 5.5.

5.7 Brake Fluid

The brake fluid level should be maintained within the marks indicated on the fluid reservoir at all times. If it needs to be topped up, use fluid complying with SA3J 17O3f DOT4 standards (minimum). Racing brake fluid will absorb water very quickly, thus needing frequent replacement, and silicone brake fluid which has been tested by Caterham Cars is NOT recommended.

To avoid brake fluid deterioration caused by water absorption, we strongly recommend that the brake fluid is changed every two years and this means the existing fluid must be drained from the bleed valves on all four brake calipers (De Dion) or both the front calipers and the left hand rear wheel cylinder (Live Axle). Note that the handbrake should not be applied and the car should be either jacked up for convenience or suitably chocked to prevent it moving.

Before opening the bleed valves clip some 1/4" internal diameter rubber or plastic tubing over the nipples in order to allow the used fluid to be drained into suitable containers. It will also be necessary to remove the cap from the fluid reservoir. With the bleed nipples open, pump out the system using steady strokes of the brake pedal.

TAKE CARE WITH BRAKE FLUID, ESPECIALLY UNDER PRESSURE. IT CAN BE DANGEROUS TO EYES AND CAN DAMAGE PAINTWORK IF IT ESCAPES. ALWAYS KEEP A BUCKET OF WATER NEAR YOU WHEN YOU ARE WORKING WITH IT.

When refilling, first close all the bleed valves and fill the master cylinder, though leave the rubber tubing and collecting receptacles in place, and use only the correct SA3J 17O3f DOT4 fluid. Brake fluid must be fresh since once a container has been opened it is rapidly contaminated by moisture in the air. In order to bleed the De Dion system thoroughly, we recommend the use of an Eezibleed brake bleeding device,which are available from Caterham Cars under part no. 79087.

The Eezibleed works by pressurising the brake system using air from the spare tyre at a maximum 20 psi and is connected to the top of the brake fluid reservoir. It is therefore very important to ensure that it is correctly fitted and sealed to the

reservoir or fluid may escape under pressure with potentially hazardous consequences.

Before starting therefore please observe the following:-

a) Before filling with brake fluid the system should be pressure tested with air at a slightly higher pressure than that used for bleeding. It is recommended that no more than 20 psi is used for bleeding and you should check carefully for leaks.

b) The Eezibleed pressure vessel cap should not be over-tightened. Make sure that the seal is flat in the cap before use. Screw the cap on until contact with the seal is felt then no more than 1/8 turn more.

c) Fresh fluid of the correct grade SA3J 1703f DOT4 only should be used.

d) Dirt, cleaning solvents, mineral oils or water will damage or impair the performance of your brakes. Contact with these substances should be avoided.

e) You will need a container to catch the fluid drained from the system. A wide based jar is ideal.

f) Brake fluid is harmful to some paintwork particularly cellulose. To avoid damage ensure that the pressure vessel and container catching the old fluid is placed safely, vertically and away from paintwork, and that the cap on the reservoir remains tightened sufficiently.

In addition on cars fitted with disc rear brakes, it is sometimes helpful whilst bleeding the system to tap the rear calipers lightly with a SOFT hammer to release air bubbles trapped in the self adjusting mechanism directly behind the pistons. Operating the handbrake can also help to release air bubbles.

Live axled cars are more straightforward to bleed, therefore although useful, an Eezibleed kit is not necessary. Carefully bleed the system using slow strokes of the brake pedal starting at the left hand rear, then the left hand front and, lastly the right hand front until a firm high pedal is achieved. It will probably be necessary to repeat this exercise a couple of times before all the air is bled away.

With the system bled and all the bleed nipples tightened the security of the braking system should be checked. Get a helper to hold the brake pedal down for about a minute whilst you check all connections, flexible hoses and the bleed nipples for any sign of leakage. The pedal should remain solid. If it slowly sinks there is a leak somewhere in the system.

De Dion cars fitted with new pads may seem to have excessive pedal travel despite being fully and properly bled, this being due to the high mechanical advantage of the pedal. In use, however, the system will improve dramatically within a few miles as the pads bed to the discs.

5.8 Check Condition of Brake Hoses, Pipes and Unions

It is vitally important to check that all braking components are in good order and in particular the flexible hoses. Examine these carefully and if there is any sign of damage or of cracking or fraying close to the unions in particular, they must be replaced. Front brake hoses are particularly vulnerable to flying stones, so pull back the protective coils and check the hose underneath thoroughly.

We recommend that all flexible hoses, including the stainless steel braided variety, are replaced every three years. Steel brake pipes should be carefully examined for signs of corrosion and all unions should be checked for leakage. The pipes running along the De Dion tube or rear axle are vulnerable to an accumulation of road dirt so this area should be cleaned carefully to prevent such dirt causing premature corrosion.

Before replacing a brake hose, the brake fluid should be drained from the system, to prevent any leakage when the hose is removed. Any shakeproof or copper washers should be replaced along with the hose, and ensure all the unions are tight and there is no leakage once the system has been refilled.

5.9 Inspection of Steering Joints

The steering rack is supplied lubricated for life, but if the rubber gaiters at each end become damaged, lubricant can escape and water and dirt can enter, shortening the life of the rack.

It is important therefore to check that these gaiters are intact, neither split nor perished, and are replaced if necessary. A damaged gaiter will lead to MOT test failure.

The track rod ends at the end of the rack are not adjustable, so must be replaced when worn. To check these, jack up the front of the car and, rocking the wheels from side to side, check for any discernible play in the joints, noting that any play felt is not due to wheel bearings which can be adjusted (see section 5.11). Check the security of both the universal joint in the steering column where it joins the rack and that of the clamping bolts where the two halves of the steering column are telescoped together in front of the scuttle.

5.10 Lubrication of Trunnions

The trunnions are the brass swivels which enable the front uprights to be steered. These need to be kept filled with EP 90 oil (NOT GREASE) through the nipples fitted to the back of each front upright. It is possible to use a good quality grease gun filled with oil to do this, but if you do not have one of these the trunnions will need to be dismantled.

To dismantle a trunnion, first undo the 7/16" x 2 3/4" bolts holding the trunnion to the lower wishbone, remove the front hub and disc (see section 5.12) and the disc back plate (if fitted), then unscrew the trunnion from the uprights, noting that the left hand trunnion has a left hand thread. Half fill the trunnion with EP 90 oil and then screw back onto the bottom of the upright to the limit of its travel. The trunnion should then be unwound by about one turn so that it rotates freely. The rubber seal at this point should be in firm contact with both trunnion and upright. If there is a gap, then the trunnion will need to be wound up further. Re-attach the Trunnion to the lower wishbone and tighten the securing bolts to 40 lb ft.

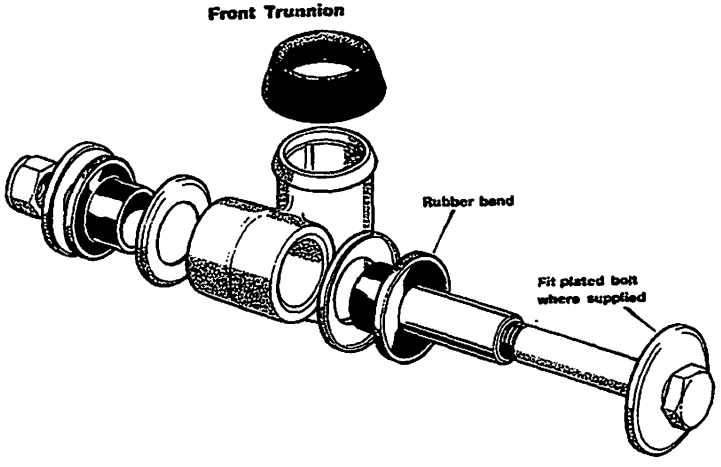


Figure 5.10 Front Trunnion Assembly

5.11 Wheel Bearing Adjustment

While the car is supported on stands for inspection of the front brakes it is important to check the front wheel bearings for play. If there is any discernible movement in either the front wheel when it is rocked from the top and bottom and from side to side, the wheel bearing will need adjustment. These bearings are of the taper roller variety and therefore this procedure is straightforward.

a) Remove the front wheel and prise the black painted dust cap from the centre of the front hub.
b) Remove the split pin from the castellated nut which holds the hub onto the stub axle and tighten this nut until the free play is taken up. Do not overtighten this nut as the wheel will be prevented from turning freely leading to premature bearing wear
c) Fit a new split pin (size 1/8" x 1 1/4") (available from most accessory shops or Caterham Cars) into the hole through the end of the stub axle which should line up with one of the slots in the castellated nut, bending over the ends to secure it in place. If it does not line up, slacken the nut slightly.
d) Refit the dust cap (Replacing if damaged) tapping into place with a soft hammer, and refit the wheel.
e) Re-check. If you can still feel any play then adjust again. Play will cause brake pad knock-off and excessive brake pedal travel.

5.12 Wheel Bearing - Repacking with Grease

At 12,000 mile intervals it is necessary to re-pack these wheel bearings with grease.
a) In order to do this follow the above procedure initially, but you will also need to remove the brake calipers which are held on with 7/16" x 1 3/4" bolts noting the position of the dust shields
b) Undo the castellated nut and remove it which will allow you to remove the front hub/disc brake assembly
c) There are two taper roller bearings, inner and outer. Clean out the old grease from the roller bearings, races and cages and inspect for damage. Should the bearing be excessively worn and fail to turn smoothly, replace.
d) Ensuring that all parts are kept as clean as possible, re-pack with grease and re-assemble the hub onto the stub axle and secure using the castellated nut, tightening to eliminate free play but ensuring that the wheel still spins freely
e) Fit a new 1/8" x 1 1/4" split pin and replace the dust cap

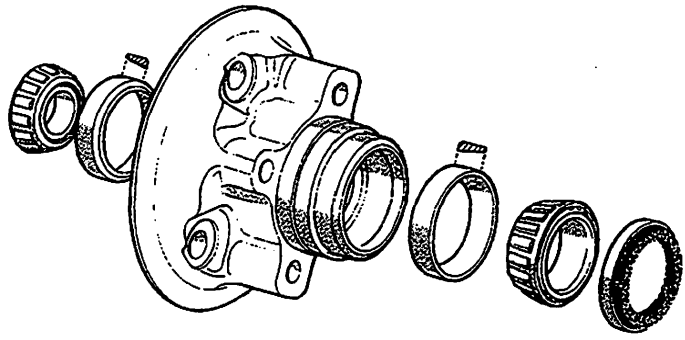


Figure 5.12 Front Hub Assembly

5.13 Tyre Condition and Pressures

Check tyres for wear and damage replacing as necessary. Lightly loaded tyres mean the Seven can be very prone to aquaplaning, tread depth should therefore never be allowed to be below 3 mm at any point across the width of the tyre or wet weather grip will be severely compromised. You should also check tyres for evidence of sidewall damage or severe cuts deeper than the tread depth and again replace if you have any doubts. In general, a Seven fitted with the recommended Michelin tyres will wear the centre of the tread more than the edges. The performance of the Seven means that tyre condition is critical from a safety point of view.

Tyre pressures should be set as follows:-

Wheel Size	Pressure
13" & 14"	20psi (1.4 bar)
15"	18psi (1.3 bar)
16"	16psi (1.2 bar)

5.14 Road Wheel Tightness

Road wheels should be neither over nor under tightened. We recommend that a good quality torque wrench be used to ensure that all wheels are tightened to 55 lbft

5.15 Front Wheel Alignment

The front tracking is set with the car on the ground, by slackening the lock nuts, rotating the track rods emerging from the steering rack and re-tightening the lock nuts again. Make certain that any adjustment is made equally at both ends so that wheel clearance and steering wheel alignment is not altered. Once the tracking has been set, check that the gaitors haven't been distorted by the rotation, if so release the ty-wrap or metal clip and rotate the gaitor over the tie rod. Wheel alignment should only be checked using a proper tracking gauge and should be set between 10 and 30 minutes toe in for road use. Incorrect alignment will cause instability and excessive uneven tyre wear

5.16 Bulb Replacement

1) Headlamps
Loosen the screw on top of the headlamp bracket until the chrome lamp surround with the light attached can be unclipped and pulled free. The wiring is released from the back of the lamp unit by pulling off the plastic connection. Cibie bulbs can be changed by removing the rubber dust cover then squeezing the retaining clip to release the bulb itself, whereas sealed beam units have bulbs integral with the reflector and glass lens. This is held into the chrome ring with a number of wire clips. Note carefully how these are fitted, then prise them out with a screwdriver allowing the complete unit to be changed.

When replacing a sealed beam unit (or a Cibie lens if cracked) note that it must be replaced the correct way up and should be positioned with careful reference to the fixing screw hole in the chrome ring. The word markings on the lens should be horizontal when fitted

2) Side/parking lamp
First release headlamps as above. Lucas sidelamps are fitted into the main headlamp connector and simply clip into place, whereas Cibie sidelamps are connected separately into the back of the headlamp and pull free to enable bulb changing.

3) Front indicators
Remove the two Phillips head screws holding the amber lens in place. The bulb can then be replaced.

4)Front indicator repeaters
Remove the single Phillips head screw holding the lens and unclip. The bulb can then be replaced.

5) Rear/stop/indicator assemblies
Again the lenses are held in place by two Phillips head screws which allow the complete amber/red lens to be removed for access. Take care when replacing this lens that it slots into its rubber housing correctly to ensure the unit remains watertight.

6) Rear fog lights, reversing lights, number plate light
Remove lenses to replace bulbs by releasing their securing screws.

Bulb Replacement Part Numbers

Light Unit	Wattage	Part Number
Headlamp (Cibie)	60/55	LLB472
Headlamp (Lucas)	45/40	SB7033
Sidelamp	5	LLB501
Front/Rear Indicator	21	LLB382
Tail/Stop	21/5	LLB380
Rear Fog	21	LLB382
Front Indicator Repeater	4	LLB233 or R233
Reversing	18	LLB270
Rear Number Plate	4	LLB233 or R233

5.17 Windscreen Washers

The screen washer bottle should only be filled with clean water to avoid clogging the nozzles. A proprietary screen wash additive can be used in proportions recommended by the manufacturer but do not add antifreeze in winter since this can damage paintwork and windscreen glazing rubbers.

5.18 Windscreen Wipers

If the wiper blades are worn or cut the screen will not be cleared properly and possibly even scratched. These blades are unique to Caterham.

5.19 HeadlampAlignment

This will need to be carried out using a proper beamsetting device which your local garage or service agent will have. However having had this done properly once, the car can be parked a set distance in front of a wall or garage door and its headlamp beam positions marked. The lights can then be realigned relative to these if necessary.

5.20 Rear Suspension 'A' Frame Bushes

The rear axle or De Dion tube is located in position laterally by an 'A' frame which, in order to cope with the twisting of the rear axle, is fitted using rubber/metal bushes. If there is any discernible lateral play in these bushes, the rear axle will not be securely located leading to erratic handling and a knocking noise under heavy acceleration/deceleration. It is therefore possible that these bushes (Caterham part no. Y16) will need to be replaced. Replacement is carried out as follows:-

a) Remove the 1/2" bolt and nyloc which holds the 'A' frame in place on the axle/De Dion tube and drop the 'A' frame down so that the bushes can be removed from their socket.

b) Fit two new rubber/metal half bushes into the socket, using rubberlube on the rubber part to aid compression.

c) Push the 'A' frame back into position and secure with the bolt and nyloc tightening to 40 lb ft. It may be helpful to use two thin metal strips each side of the axle/De Dion bracket in order to 'shoehorn' the 'A' frame into position, or alternately use a 'G' clamp to compress the bushes.

All De Dion cars produced after September 1993 have been fitted with a single metalastic bush. A press will be needed to replace one of these bushes. Unfortunately this bush cannot be fitted to live axle cars at all or to De Dion cars without changing the De Dion tube.

5.21 Suspension Fixings

With use it is possible for the suspension fixings, despite the use of nyloc nuts, to come loose, especially if covering a high mileage on poor roads or if used for competition purposes.

It is extremely important not to overtighten these fixings, in particular the smaller size bolts such as the lower front wishbone to chassis spindle mountings. Use a good quality torque wrench and if in doubt slacken off a bolt before re-tightening to the correct torque.

Dampers have an estimated life of 36,000 miles after which although not strictly unsafe, the cars handling will have deteriorated considerably; Caterham dampers work hard for their living. Tightening the adjustment screws on Spax dampers will not compensate adequately for wear. However should they show any sign of leakage they must be replaced immediately. Please note that dampers are always replaced as a pair for each end of the car, otherwise the handling will be thrown out of balance.

At the same time as checking suspension fittings, you should also check the front wing mountings and in particular the galvanised bolts holding clamshell wings to the headlamp brackets which can vibrate loose. Engine mounting bolts should be inspected also.

5.22 Battery Maintenance

From the mid-eighties up until early 1995, all Caterham Sevens were supplied with 'Torque Starter' gel batteries which are fully sealed and thus impossible to top up. These batteries are very reliable when maintained, however if left idle for a long period and allowed to go flat, they are unlikely to accept a charge. Once the voltage level drops below 8.5 volts, an irreversible chemical change occurs, preventing a recharge.

In early 1995 the Torque Starter was withdrawn from the market. As a result, a lead acid battery is now supplied with all new kits and as a replacement for existing cars. This is of similar size to the Torque Starter, and will fit into the battery trays of all cars other than those supplied in 1994 and the first couple of months of 1995. A new strap arrangement will be required, which will need an extra hole to be drilled in the tray itself.

The battery posts on the new battery accept bolt on terminals as opposed to the round posts of the torque starter, it is possible to fit old battery cables to the new battery, however new leads are the ideal answer and are available from Caterham Cars.

It is important to keep an eye on the acid level of the new battery and to top it up when required. The battery has a vent in its top to which a length of hosing should be connected (screen washer hosing is ideal) so that the battery vents below the level of the chassis, preventing acid leaking onto the aluminium panels.

5.23 Battery Replacement

1) Live Axle and Pre '90 de Dion

on these chassis' the battery is mounted low in the engine compartment in front of the pedalbox (RHD). Once the battery has been disconnected and the locating clip removed, the battery can be removed from its tray and moved back and out from underneath the chassis. It may be necessary to remove the coil to increase clearance to the front of the pedal box.

2) 1990 to 12/93 Ford and Vauxhall De Dion

On these chassis the lower engine bay diagonals were revised, which prevents the battery from being removed from below. To give enough clearance to remove the battery through the top of the engine compartment, the following components need to be removed:-

Steering column assembly
Ignition coil (if mounted on front of pedalbox)
Rear carburettor and air filter assembly

It may also be necessary to gently push the solid brake line back slightly along the side panel of the car for a little extra clearance.

To remove the column, remove the bolt clamping the column to the universal joint and remove the clamp joining the upper and lower columns together under the brake master cylinder. The grub screw should be removed before the two bolts holding the two halves of the clamp together. With the ignition key in the barrel to disengage the steering lock, the complete steering column, with the steering wheel still attached, can withdrawn into the cockpit of the car. Complete removal is not essential.

Before removing the rear carburettor, remove the return spring and the throttle cable and detach the throttle cable bracket from the rear carb. After detaching the fuel supply and plugging it with a 5/16" bolt, undo the four nyloc retaining nuts and remove the carburettor, with the filter still attached.

With the coil removed also the battery can now be removed through the gap between the side of the car and the diagonal tube.

Refitting is the reverse of removal. Make sure you do not overtighten the carburettor retaining nuts, it should be possible to move the carburettor up and down relative to the engine. Take care to fit the steering wheel such that it is

correctly aligned. The various steering column bolts should be torqued up according to the figures in the table at the end of this chapter.

Re-balance the carburettors, following the instructions in section 6.2 (Ford) or section 7.5 (Vauxhall)

3) Pre '94 De Dion Rover

The battery is again located low down on the right hand side of the engine bay in a Rover powered car, due to the fuel system however, it is not a simple job to remove the intake manifold to gain access.

To remove the battery the steering column needs to be removed, as for a Ford powered car. With the engine supported on a jack or from a hoist, remove the right hand engine mounting bracket. The forward manifold support bracket should also be removed.

With the steering rack rotated to move the pinion and universal joint down, the battery can be moved around the side of the engine and up the front of the engine between the cambelt cover and the upper chassis cross tubes. The engine may need to be raised or lowered at various stages to increase clearance. the lower radiator hose will need to be pushed out of the way also, but not disconnected.

4)Vauxhall Injection and all De Dion, 94>

Access to the battery on these cars is relatively easy as the battery is mounted on the heater tray in front of the scuttle. The battery can simply be disconnected and removed. It is recommended for earlier De Dion cars, (particularly 1990 on) that the battery is moved to this position for ease of access and servicing. Battery cables are available for all engines to allow the battery to be moved.

5.24 Seat Belts

Check that all mounting bolts are secure and that there are no signs of cuts or fraying in the webbing. Frayed or cut belts or belts that have been subjected to collision loads must be replaced immediately. Seat belts should be cleaned only with a mild soap solution and warm water, chemical cleaners may cause damage.

The seat belt manufacturers recommend that belts be replaced at between 5 and 7 years due to deterioration of the webbing.

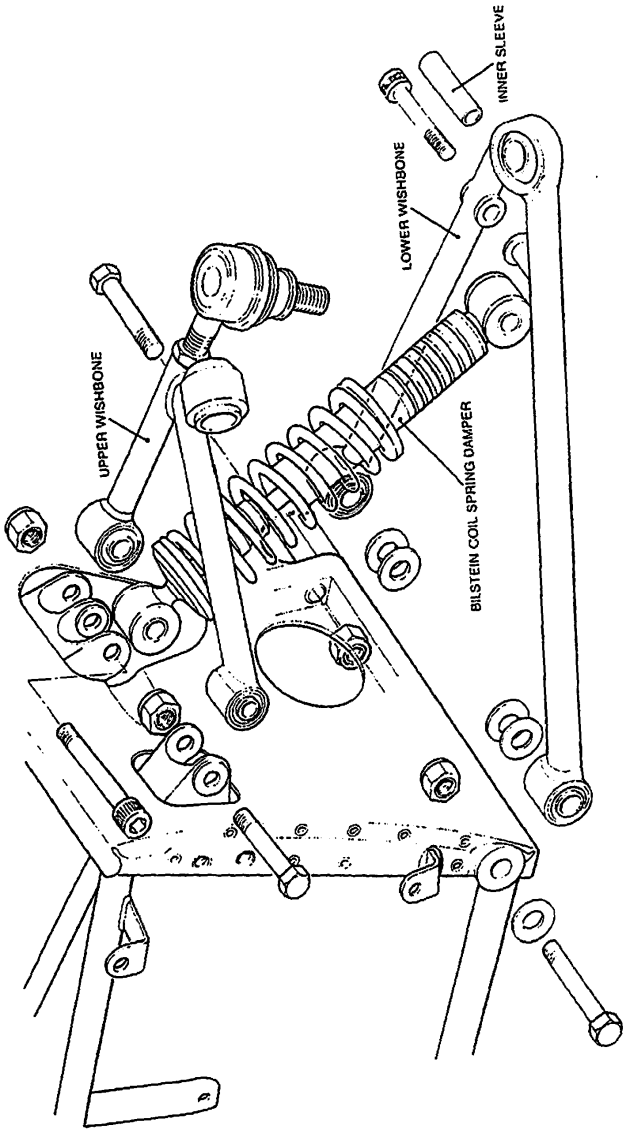


Figure 5A Front Suspension Assembly - De Dion

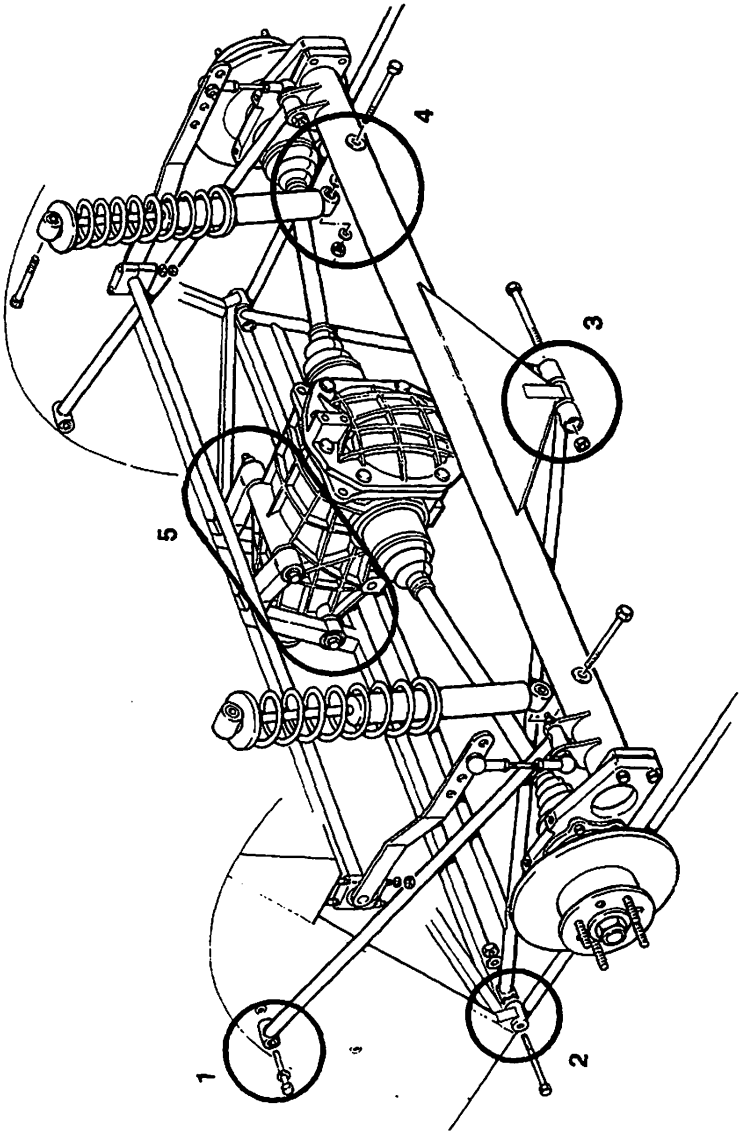


Figure 5B Rear Suspension - De Dion

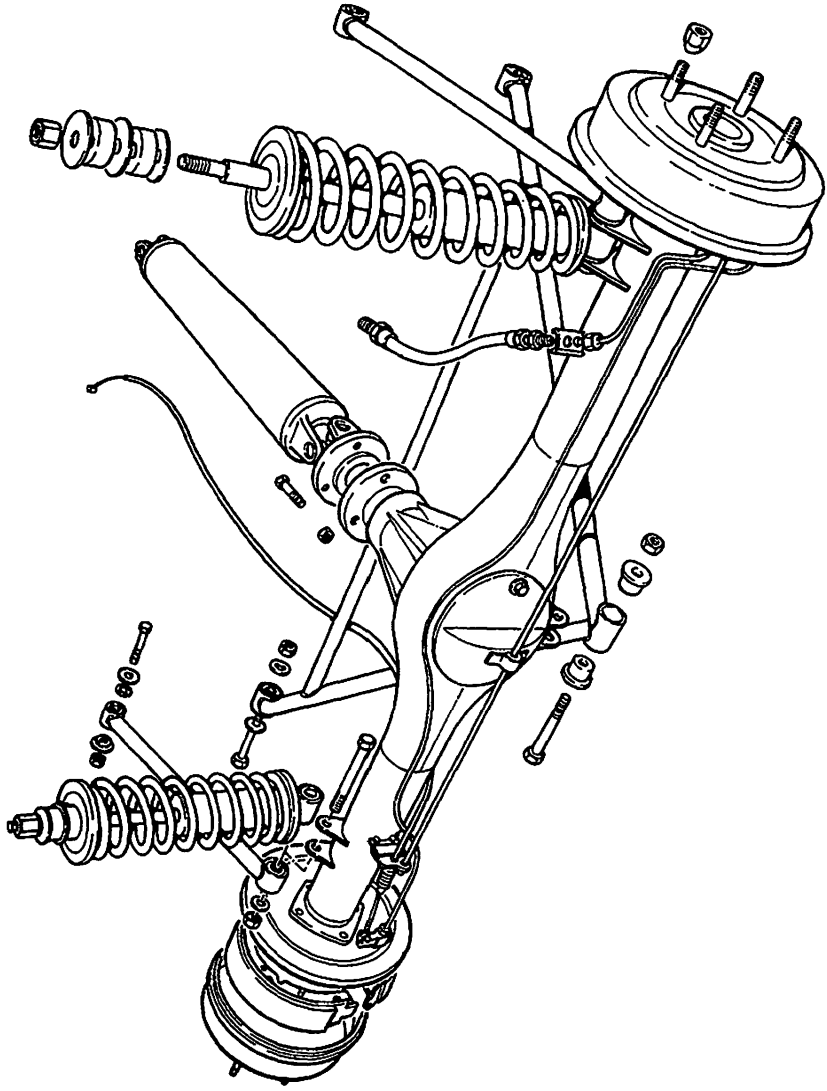


Figure 5C Rear Suspension Live Axle

Front Upright Assembly Torques

Bolt Size	Usage	Torque
7/16"UNF x 1 7/8"	Steering arm to upright	22-27 lbft
1/2" nyloc	Stub axle	60-65 lbft
3/8"UNF x 1 1/2"	Brake disc to hub	22-27 lbft
1/2" castellated	Front hub nut	see text
7/16"UNF x 1 1/4"	Brake caliper bolts	40-45 lbft

De Dion Front Suspension Torques

Bolt Size	Usage	Torque
1/2"UNF x 3 1/2"	Damper / upper wishbone mount	60 lbft
3/8"UNF x 2"	Upper wishbone - forward mount	20-25 lbft
1/2"UNF x 4"	Lower wishbone mounts	60 lbft
5/16"UNF x 2 3/4"	Lower wishbone to damper	12-15 lbft
M14 nyloc	upper balljoint	20-25 lbft
1/2" nyloc	lower wishbone to upright	40 lbft
5/16"UNF x 1 1/2"	Anti-roll bar brackets	12-15 lbft

Front Suspension (Live Axle Type) Torques

Bolt Size	Usage	Torque
1/2"UNF x 4"	Damper & upper link to chassis	40-45 lbft
5/16"UNF x 2 3/4"	Anti roll bar blocks	12-15 lbft
1/2" nyloc	Anti roll bat to upper link	20 lbft
1/2"UNF x 3 1/2"	Lower wishbone rear mount	40-45 lbft
5/16"UNF x 1"	Lower wishbone front mount	12-15 lbft
1/2"UNF x 2 1/2"	damper to lower wishbone	40-45 lbft
7/16"UNF x 2 3/4"	wishbone to trunnion	30-35 lbft
7/16" nyloc	Toplink to upright	20-25 lbft

Steering System Torques

Bolt Size	Usage	Torque
1/4"UNF x 2 3/4"	Steering rack clamps	5-8 lbft
5/16"UNF x 1 3/8"	Column U.J. bolts	12-15 lbft
1/4"UNF x 1 1/2"	Column clamp bolts	8-10 lbft
9/16" nyloc	track rod end to upright	20-25 lbft

De Dion Rear Suspension Torques

Bolt Size	Usage	Torque
1/2"UNF x 11"	Upper diff bolt	40 lbft
M12 x 65mm	Lower diff bolts	40 lbft
M10 x 40mm	De Dion ears	35 lbft
M10 x 55mm	Hub carrier - front	35 lbft
M10 x 65mm	Hub carrier - rear	35 lbft
3/8"UNF x 7/8"	Disc to drive flange	30 lbft
41mm A/F	rear hub nut	200 lbft
M10 x 55	Calipers to ears	35 lbft
3/8"UNF x 2"	Radius arm front	35 lbft
1/2"UNF x 2 1/2"	Upper damper mount	60 lbft
1/2"UNF x 2 1/2"	Radius arm to De Dion tube	60 lbft
1/2"UNF x 5"	Lower damper mount	60 lbft
1/2"UNF x 2 1/2"	A frame to De Dion tube	60 lbft
1/2"UNF x 4 1/2"	A frame to chassis	60 lbft
5/16" nyloc	Anti-roll bar clamps	7-10 lbft

Live Axle Rear Suspension Torques

Bolt Size	Usage	Torque
3/8" half nut	upper damper mount	See text
1/2"UNF x 4 1/2"	Damper & radius arm to axle	40 lbft
3/8"UNF x 3 1/4"	Radius arm to chassis	25-35 lbft
1/2"UNF x 4"	A frame to chassis	40 lbft
1/2"UNF x 2 1/2"	A frame to axle	40 lbft

SECTION 6

SERVICE INFORMATION - FORD ENGINE

6.1 Change of Oil and Filter

To drain the oil from the engine it is important that the engine is warmed first in order that the oil will drain more thoroughly. Remove the oil filler cap and remove the sump drain plug using a 7/8" AF spanner.

REMEMBER TO PUT A SUITABLE RECEPTACLE UNDER THE SUMP.

The filter is removed using a chain wrench, noting that it unscrews in an anticlockwise direction when viewed from below. Before fitting the new filter, half fill with oil and apply a thin film of oil to the rubber seal. This will ensure an oil tight seal to its aluminium housing. The filter should be done up hand tight only as use of the wrench can cause overtightening and damage to the aluminium casting.

Replace the sump plug, tightening to 15 lb ft and refill with new oil, up to the 'max' mark on the yellow plastic dipstick . Please note that earlier cars used a recallibrated metal dipstick - do not use the original Ford maximum mark.

Caterham Cars recommend the use of a premium motor oil such as BP Visco 2000 or Mobil 1. High quality synthetic oils such as these do not allow the engine to bed in when new however, so we recommend and use good quality mineral oil when running in. Replace the oil filler cap. Remove the spark plugs and turn over the engine on the starter motor until pressure shows on the oil pressure gauge. Check the engine for leaks before starting it.

6.2 Carburettor Security and Adjustment

1) Twin Weber 40 DCOE (Sprint, Supersprint and BDR)

The only adjustments required are synchronisation, mixture strength and idling speed. These adjustments are effected by the idle speed adjustment screw, the interconnecting throttle arm screw (or balance screw) and the four idling mixture volume adjustment screws (or mixture screws). See figure 6.2 for clarification.

a) Ensure that the engine has reached its normal running temperature. The warmer the engine the easier the adjustment will be.

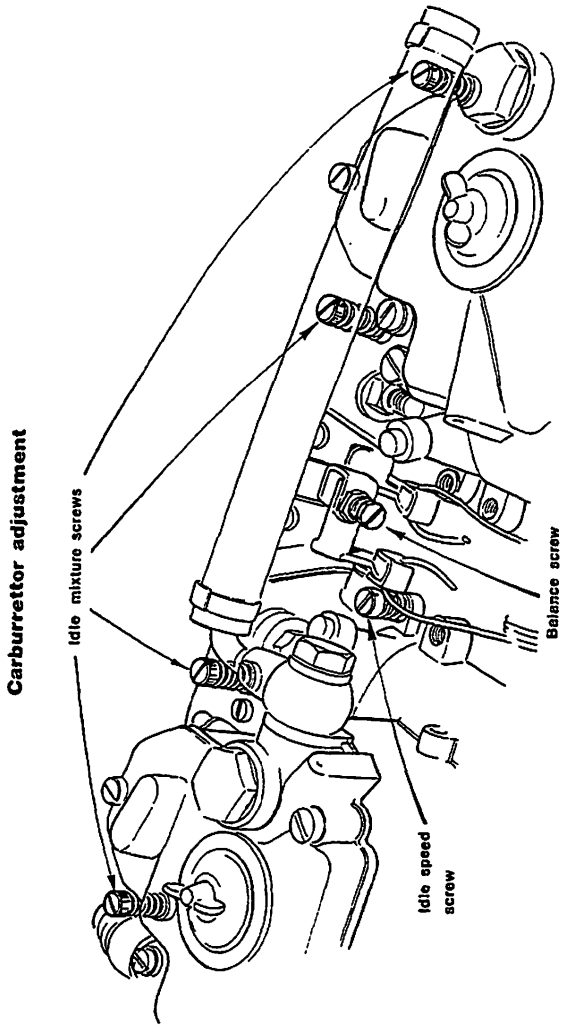


Figure 6.2 Carburettor Adjustment Points

The carburettors should be set-up as follows:-

b) Check that there are no air leaks at the 'O' ring gaskets.

c) Set all four mixture screws approximately 2 full turns open.

d) Adjust the rear carburettor idle screw to give approximately 1000 rpm.

e) Synchronize the carburettors by following this procedure:-

Remove the two air filters, then using a proprietary carburettor balancing tool - a good quality one is available from Caterham under part number 98001.000 - adjust the balance screw until the air flow through each carburettor is the same.

f) Adjust each mixture screw in turn. One at a time, screw each one right in and unscrew a small amount at a time (not more than 1/8 turn) waiting approximately 5 seconds at each setting. A point will be found which will cause a rise in engine revolutions and continued unscrewing beyond that point will cause the revolutions to drop back again. Each screw must be adjusted to give the maximum rise in revolutions.

NOTE: during the course of items e) and f) it will be necessary to re-adjust the idle speed adjustment screw from time to time to maintain the engine revolutions at around 1000 rpm.

g) Repeat d), e) and f) (possibly several times) until no further improvements can be obtained.

h) Adjust the idle speed adjustment screw to give an idle of 900 to 950 rpm.

The twin DCOE Webers are held onto the manifold using special anti-vibration grommets to prevent engine vibration from causing frothing of fuel in the float chambers. These grommets are sandwiched using captive washers and the correct gap between them should be between 0.015" and 0.025" (0.38mm and 0.64 mm). Adjust this gap by tightening or loosening the 5/16" half nyloc UNF nuts which hold the carburettors onto the manifold.

2) Single Weber Twin Choke Downdraft - 1600GT

Unlike the sidedraft DCOE carburettors, the single downdraft is bolted rigidly to the standard Ford inlet manifold. This carburettor is sealed and mixture adjustment is not possible so that the only setting up necessary is to adjust the idle mixture and slow running. The normal idle speed is 900 - 950 rpm and the idle mixture should be adjusted so that the engine idles smoothly without hunting (too rich) or stalling.

6.3 Valve Clearance Adjustment

Adjustment should be made with the engine hot in the case of 1600 GT and 100 BHP 1600 Classic SE engines and cold on 110 BHP 1600 Sprint and 1700 Supersprint engines.

Valve clearances are extremely important to both the performance and reliability of your engine. If the clearances are set too loose, the valves will open later and close earlier than optimum allowing less fuel/air mixture to enter the combustion chambers and if set too tight there is a danger that, under operating conditions, the valves may be prevented from fully closing leading to burning of the valve head and possible warping of the valve.

To adjust the valve clearances, undo the four screws holding the rocker cover in place and remove the cover to reveal the valve gear. It is important that the valve clearance is set relative to the heel of the cam, hence you should set clearances in the following order: You should note as a double check that the sum of the valve number open and the valve to be set always equals nine.

Fully Open Valve	Check and Adjust	Valve Clearances		
		1600GT (hot) 100BHP ClassicSE	110BHP Sprint (cold)	Supersprint (cold)
8	1 Exhaust	0.022"	0.022"	0.024"
6	3 Inlet	0.010"	0.020"	0.022"
4	5 Exhaust	0.022"	0.022"	0.024"
7	2 Inlet	0.010"	0.020"	0.022"
1	8 Exhaust	0.022"	0.022"	0.024"
3	6 Inlet	0.010"	0.020"	0.022"
5	4 Exhaust	0.022"	0.022"	O.024"
2	7 Inlet	0.010"	0.020"	0.022"

Check valve clearances using feeler gauges, noting that when correctly set the gauge will be neither so tight that it cannot be pulled free nor so loose that no resistance can be felt. Valve clearances are adjusted by turning the self-locking adjusting screws with a 7/16" AF RING SPANNER until the correct clearance is achieved. Do not use an open ended spanner as this can damage the adjusters. When adjustment is complete replace the rocker cover using a new gasket and do not overtighten to avoid leaks. Cosworth BDR engines should not be maintained other than by experts and therefore we do not recommend that you attempt valve clearance adjustment on these engines.

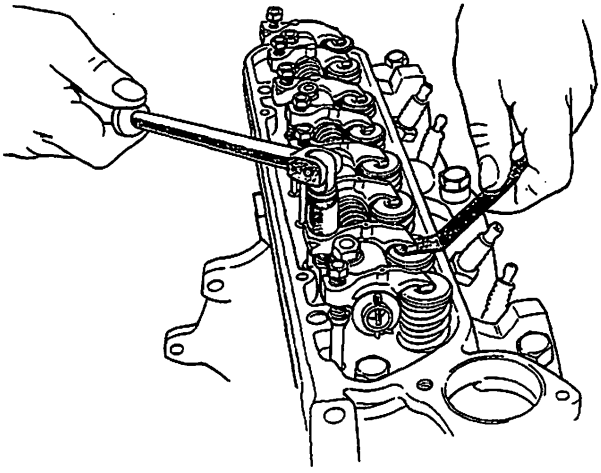


Figure 6.3 Valve Clearance adjustment

6.4 Spark Plugs

The spark plugs should be removed, cleaned and inspected at the 6,000 mile service, and replaced at 12,000 miles. After a period of use, the plugs become fouled up with carbon and must be cleaned. The only really satisfactory way of doing this is by means of a plug cleaning machine. Whilst the end of the plug can be cleaned reasonably well with a wire brush, the interior cannot. When the plug has been cleaned, reset the gap between the centre electrode and the outer electrode to the appropriate gap by bending the outer electrode only. When correctly set, the feeler gauge should just push into the gap, no force being needed, but without play. All the spark plugs used in Ford crossflow engines should be set to give 0.025" (0.6mm) gap.

6.5 Contact Breakers Adjustment or Replacement

Cars fitted with Lucas Electronic ignition systems (which include all BDR engines) dispense with contact breakers so adjustment or replacement is never required. Leaded engines use Bosch distributors (red cap) and unleaded engines (all engines supplied from 1990 onwards) use Lucas bodied special distributors (black cap). On 1600 GT engines, adjustment or replacement can be achieved

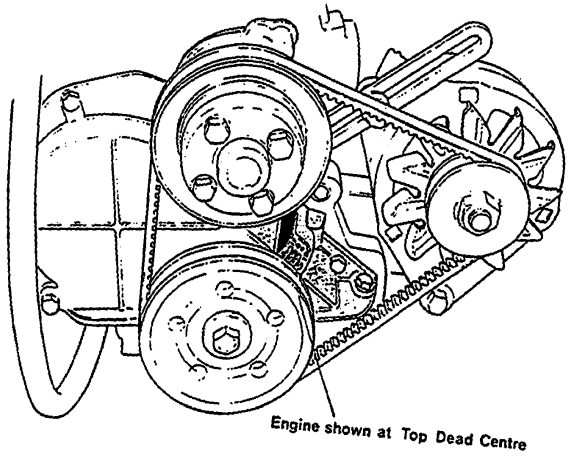
with the distributor in place, but on engines fitted with Weber DCOE sidedraught carburettors it is much easier to remove the distributor from the engine.

1) Distributor Removal
Firstly remove the distributor cap which is clipped into position on all engines. 1600 GT engines use a normal top exit cap but, due to the restricted clearance under Weber DCOE carburettors, all other crossflow engines use a special side exit cap. If you choose to remove the distributor from 1600 GT engines it will also be necessary to disconnect the vacuum advance capsule, and the low tension lead should be disconnected on all enginesfitted with points. To ensure that the timing is not lost when the distributor is removed, turn the engine over until the notch on the crankshaft pulley aligns with the TDC mark on the timing cover (see 6.5). You should then remove the distributor cap and check that the rotor arm is pointing at No 1 H.T. (spark plug) lead. If it points to lead No. 4 rotate the engine a further complete turn and line up the marks again when the rotor arm now faces No. 1 (this is because the distributor rotates at half engine speed).

Slacken the distributor clamp plate, having taken note of its exact position relative to the engine (marking both will help) as well as the rotor arm position, and remove the distributor from the engine. It is advisable to take steps to prevent the engine accidentally being turned over with the distributor removed, ie. if you have been rocking the car whilst in gear, put the gearbox into neutral and apply the handbrake. By taking these simple steps it should be possible to replace the distributor without upsetting the timing so much that the engine will not run. However it is very important that the car is not driven until the timing is set accurately, ideally using a stroboscopic timing light.

2) Contact Breaker Adjustment/Inspection
a) Gently prise the contact breaker points open to examine the condition of their faces. If they are rough, pitted or dirty, it will be necessary to remove them for cleaning or for replacement points to be fitted.
b) Assuming that the points are satisfactory (or that they have been cleaned or replaced) measure the gap between the points by turning the engine over until the heel of the breaker arm is on the highest point of the distributor cam.
c) The gap between the contacts should be 0.025" (0.6mm), this being the same for all engines except those with Bosch distributors which should be 0.019" (0.5mm).
d) If the gap varies from the above the points will need to be adjusted and therefore the screw securing the contact plate must first be loosened. The gap is adjusted by inserting a screwdriver in the notched hole in the contact plate. Turn this clockwise to increase and anti-clockwise to decrease the gap. When the gap is correct, tighten the securing screw and check the gap once again.

Crossflow Engine



B/ Cosworth BDR Engine

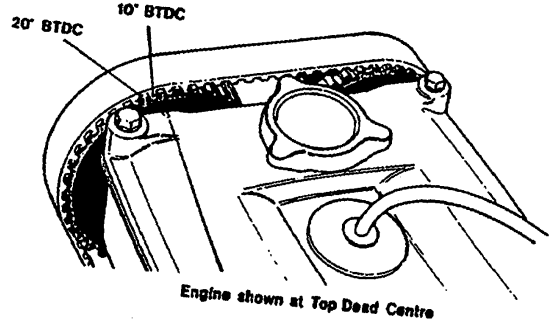


Figure 6.5 Engine Timing Marks

3) Contact Breaker Replacement

a) If the contact breaker points are burned, pitted or badly worn they must be removed and replaced. First however it will be necessary to remove the rotor arm which is a push fit onto the distributor spindle.

b) Disconnect the low tension female Lucar connector from the spade terminal adjacent to the externally mounted condensor.

c) Remove the securing screw and lift the points assembly clear by sliding up the pivot pin.

d) Replacing the points is simply the reverse of the above procedure, the gap being set as previously described.

Engines supplied by Caterham prior to 1984 were fitted with Motorcraft distributors and it is likely that non-Caterham supplied engines will be so fitted. The procedure for points replacement is broadly similar but the contact breaker gap should be 0.025" (0.6mm).

4) Final Checks - Distributor

a) Before re-assembly, clean out the inside of the distributor cap using a dry cloth and check the condition of the four contacts. If any of these are burned or scored, or if there is any sign that the cap is cracked, it should be replaced. Also check that the sprung carbon brush in the centre of the cap moves freely and that it projects at least 1/4".

b) Check the condition of the rotor arm. Again, if its contacts show sign of wear or scoring, it should be replaced.

c) You should also lightly grease the distributor cam which opens the points gap. Use just the smallest trace of grease for this or it will be sprayed around inside the distributor with adverse effects on good electrical contacts.

d) Check also, while the distributor is apart, that the automatic advance/retard weights are adequately lubricated adding a small amount of oil if necessary.

6.6 Checking and Setting of Ignition Timing

All Ford engines, including BDRs, share the same basic cylinder block and therefore the ignition timing can be set in the same way. The crossflow engine timing marks are located on the left hand side of the timing cover on the front of the engine, just behind the crankshaft pulley. The rear edge of the crankshaft pulley has a notch in it corresponding to top dead centre. The marks on the timing cover correspond to top dead centre, 4, 8 and 12 degrees before top dead centre (BTDC). On Cosworth engines the timing marks are found behind the left hand (exhaust) camshaft pulley and correspond to TDC, 10 and 20 degrees BTDC. (See figure 6.5)

The static timing (below 1000 rpm) for crossflow based engines is as follows

Ford crossflow (unleaded 1990>)	14 degrees BTDC
Ford Crossflow (pre 1990)	10 degrees BTDC
1600 BDR	TDC
1700 BDR	6 degrees BTDC

Engines fitted with contact breaker ignitions can be checked without the engine running using a test bulb connected between the distributor low tension terminal and earth. This is not possible with electronic ignition systems.

However, we recommend that the timing is checked with the engine running using a stroboscopic timing light as this will be more accurate. The timing is adjusted by twisting the distributor and its clamp will therefore need to be loosened as in the previous section covering its removal. Make certain that the distributor body clamp is tight once the timing has been set.

Warning Excessive engine advance will cause detonation or pinking. This can cause severe internal damage and must be avoided. If you are not confident that your engine is correctly timed please seek professional advice. If in doubt, contact us at Dartford, but avoid driving your car if you believe it is pinking.

6.7 Check Security/condition of Ancillaries and Exhaust System

It is possible with time that engine ancillaries can work loose in service, particularly in competition usage, and it is important therefore that the security of bolts holding items such as the starter motor, alternator, engine mounting brackets, carburettors and inlet manifolds are checked. Please ensure that no fittings are over tightened as it is possible to damage threads and overstress components by doing so. We include a list of all engine related torque settings at the rear of this section of the manual. You should always use a good quality torque wrench to be certain that bolts are tightened correctly.

Bolts not covered by the list should be tightened as follows

Spanner Size	A/F	Metric	Torque(lb/ft)
1/4 UNF/UNC or M6	7/16	10mm	3-5
5/16 UNF/UNC or M8	1/2	13mm	12-15
3/8 UNF/UNC or M10	9/16	17mm	20-25
7/16 UNF	5/8 or 11/16		30-35
1/2 UNF or M12	3/4	19mm	40-45

The exhaust system should be checked for leakage and to make certain that all clamps are properly secured. In particular check the rear strap from which the exhaust tail pipe is hung behind the nearside rear wheel and the bobbin by which the silencer is attached to its rear bracket, and replace either if they appear to be cracked, perished or fraying. If the exhaust is leaking we recommend that you dismantle the joint concerned, clear away the cracked sealant and replace with Holts Firegum or similar. The Caterham exhaust system is made from high quality stainless steel and therefore corrosion should not be a problem. Please note that older cars fitted with Lotus twin-cam or Cosworth BDA engines with 3 bolt exhaust flanges were not fitted with stainless steel exhaust systems.

6.8 Check Alternator Drive Belt

There should be no more than 1" vertical movement in the alternator drive belt between the water pump pulley and the alternator pulley. If there is more than this it should be tightened by swinging the alternator away from the engine. To do this, first loosen the two 5/16" bolt holding the alternator onto its mounting bracket, then slacken the 8mm screw holding it onto its tensioning strap. When the tension is correctly set, retighten all three alternator mountings and recheck the tension to ensure it has not slipped during tightening.

If the belt shows any signs of wear or fraying it must be replaced.

6.9 Cooling System

The water level in the cooling system should be maintained so that, with the level full to the radiator cap on the thermostat housing, the overflow bottle is about a quarter full.

When the engine is hot, expansion may allow the overflow level to rise slightly but this should return to normal when the engine cools. DO NOT remove the radiator cap from a hot engine,as there is considerable danger from scalding as a result of escaping steam and fluid. With a cool engine, remove the radiator cap and check the level, topping up with clean water and antifreeze if necessary. Antifreeze should be maintained at a 33% proportion and one containing a corrosion inhibitor should be used. Check all rubber hoses, including those to the heater if fitted, and ensure that connecting clips are tight and that any hoses showing signs of splitting or swelling are replaced.

Pre 1986 cars will need the radiator hoses to be shortened.

6.10 Clutch Adjustment

The clutch cable is adjustable at both the bellhousing and pedal box ends and should be set such that the minimum length of outer cable intrudes into the pedal box. This will minimise the strain on the cable caused by the arc of movement of the clutch pedal.

The 'bite' point can be set according to personal preference but care should be taken to ensure it is not so adjusted as to prevent the clutch from fully engaging causing slipping (high pedal) or from fully disengaging causing difficulty in engaging gears (low pedal). (see Fig. 6.10)

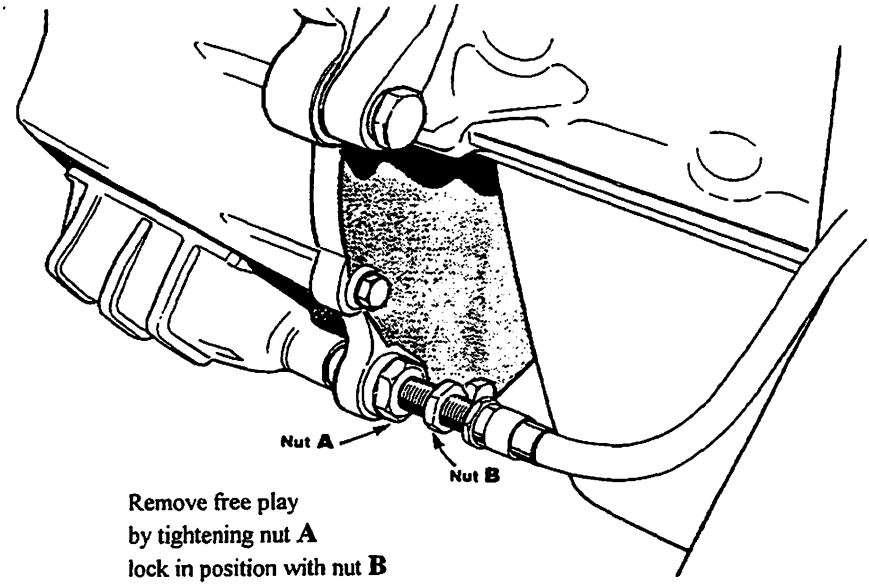


Figure 6.10 Clutch Cable Adjustment

6.11 Air Cleaner

At 12,000 miles, the foam element type filter fitted to 1600 GT engined cars should be removed and cleaned using paraffin. Remove the top of the aircleaner secured by caphead nuts and lift out the filter element. When refitting, check that it is properly seated in the lower part of the filter housing.

This method of cleaning also applies to 1600 Sprint engines manufactured prior to 1984.

Later cars fitted with twin 40 DCOE carburettors are equipped with K & N filters which do not require maintenance until 30,000 miles. These can be dismantled and the elements either cleaned or replaced as appropriate.

6.12 Carburettor Fuel Filters

Weber DCOE carburettors are each fitted with a small filter in the top of each unit adjacent to where the fuel union is joined to the carburettor body.

Remove the 19mm brass bolt and lift out the small filter from underneath. These filters should be thoroughly cleaned with paraffin and ideally blown dry with an airline.

1600GT engines are not fitted with fuel filters.

6.13 Crankcase Ventilation Valve (1600 GT only)

This valve is situated on the right hand side of the cylinder block behind and above the fuel pump. This valve can clog with use and should therefore be replaced at 12000 miles. It is a simple push fit into its rubber 'O' ring.

6.14 Tightening of Cylinder Head Bolts

(500 mile service only) Ford recommend that at the end of the first 500 mile running period the cylinder head bolts will need to be retightened using a good quality torque wrench. This is not done at the factory as it has not proved necessary.

In order to prevent possible distortion it is important that the ten head bolts are tightened in the correct sequence, shown in the diagram. All bolts are tightened to 66-71 lb ft.

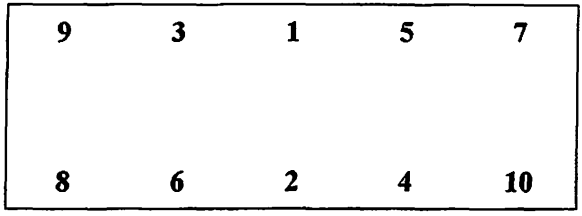


Figure 6.14 Cylinder Head Bolt Tightening Sequence

Ford Engine Bolt Torques

Bolt Size	Usage	Torque
M12 x 60mm	Bellhousing to gearbox	45 lbft
M12 x 25mm	Gearbox Mount	45 lbft
5/16"UNF x 1 3/4"	Engine Mounting rubbers	12-15 lbft
5/16"UNF x 3/4"	Gearbox mount to chassis	12-15 lbft
5/16"UNF x 1 3/4"	Upper engine bay diagonals	25 lbft
5/16"UNC x 3/4"	Engine mounts to block	12-15 lbft
1/2"UNF x 2 1/2"	Engine mounts to rubbers	40 ftlb
3/8"UNF x 1"	Propshaft to axle (Ital)	25 lbft
5/16"UNC x 1"	Thermostat Housing	12-15 ftlb
5/16"UNF x 1"	Exhaust Mounting Bracket	12-15 ftlb
5/16"UNC x 1"	Exhaust Manifold	12-15 ftlb

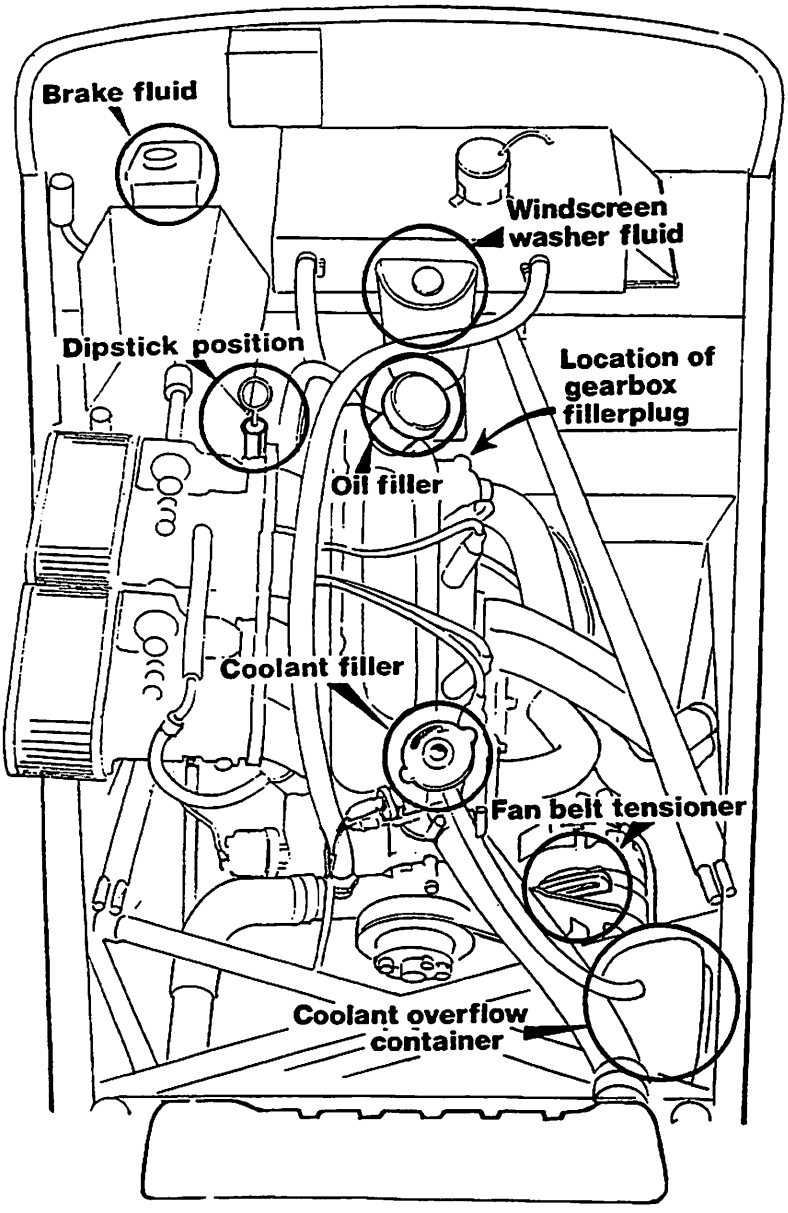


Figure 7A Service Locations - Ford Crossflow Engines

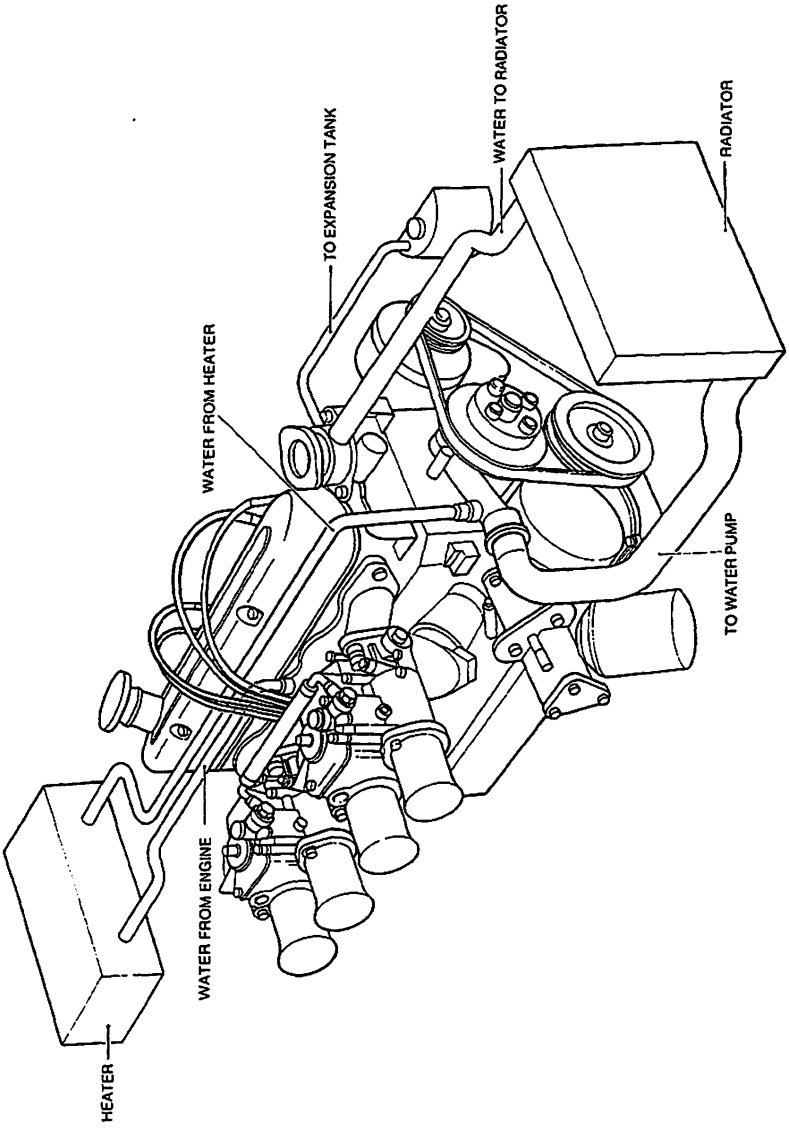


Figure 7B Cooling System - Ford Crossflow Engine

SECTION 7

SERVICE INFORMATION - VAUXHALL 16 VALVE ENGINE

7.1 Change of Oil and Filter (Wet Sump)

To drain the oil from the engine it is important that the engine is warmed first in order that the oil will drain more thoroughly. Remove the oil filler cap and remove the sump drain plug using a 3/4" AF spanner.

REMEMBER TO PUT A SUITABLE RECEPTACLE UNDER THE SUMP.

The filter is removed using a chain wrench, bearing in mind that unscrews in an anticlockwise direction when viewed end on. Before fitting the new filter, partially fill with oil and apply a thin film of oil to the rubber seal. This will ensure a better oil tight seal to its aluminium housing. The filter should be done up hand tight only as use of the wrench can cause overtightening and damage to the aluminium casting. Please note that Caterham use a special short filter with a thread adaptor to maxixmise ground clearance.

The filter should be changed every 3,000 miles on carburettor cars and every 6,000 on injected cars where less fuel is able to get into the oil.

Replace the sump plug, tightening to 15 lb ft and refill with new oil, to the correct (recalibrated) level marked on the dip stick with a line scribed into the metal dipstick. Please note that this line is higher than the standard Vauxhall max. marking due to the shallower sump.

Caterham Cars recommend the use of a premium motor oil such as BP Visco 2000 or Mobil 1. Replace the oil filler cap. Remove the spark plugs and turn over the engine on the starter motor until pressure shows on the oil pressure gauge. Check the engine for leaks before starting it.

Every 6,000 miles the Vauxhall foam sump insert needs to be changed, to ensure it doesn't become clogged. Remove the sump pan by releasing the 14 caphead bolts into the engine block and the two from the bellhousing, and lower it off, removing the gaskets and the aluminium baffle plate with it. Put a new foam insert in place, and refit the assembly using new gaskets, torqueing the bolts to 6 lbft (into engine block) and 25 lbft for the bellhousing bolts.

7.2 Change of Oil (Dry Sump)

Changing the oil on a dry sumped Vauxhall engine is rather more involved as the oil needs to be drained out of both the belltank housing and the sump itself. With the engine having been warmed up, follow these steps:-

a) Drain the oil remaining in the sump by removing the allen key blanking plug at the rear of the sump.

b) Remove the forward end of the braided hose connecting the belltank (low down on the left) to the sump and drain the oil out of the belltank through this hose.

c) Once as much as possible of the oil has been drained, remove the base plate of the belltank housing by undoing the retaining bolts.

d) Thoroughly clean the bottom plate and the surrounding area of the belltank, and refit with a small application of silicon sealant. use loctite on the bolts and torque to 6 lbft.

e) Refit all the unions and blanking plugs and refill the belltank housing to above the level of the central slave cylinder housing.

f) With the spark plugs removed turn the engine over on the starter motor until oil pressure registers on the gauge.

g) Start the engine and with the engine running recheck the oil level, which should reach the top of the slave cylinder housing or the bottom of the ramp behind the clutch cover. Top up as necessary. The nominal capacity is 4 litres

Changing the oil filter is exactly the same as for a wet sump car, but a dry sump car does not have a foam insert in the sump. There should be no need to remove the sump pan as a normal service operation. If the dry sump pan does have to be removed, please note that no sump gasket is required.

NOTE The oil level for a dry sump car should *always* be checked with the engine running.

7.3 Hydraulic Tappets

All Vauxhall 16v engines, except certain tuned versions(e.g. Swindon 235 and JPE), have hydraulic tappets which will not require adjustment at any stage. certain tuned versions are upgraded to mechanical tappet specification which are set with the use of shims, we recommend mechanical tappet adjustment (should it prove necessary) is completed by experts. Adjustment will not be a normal service requirement.

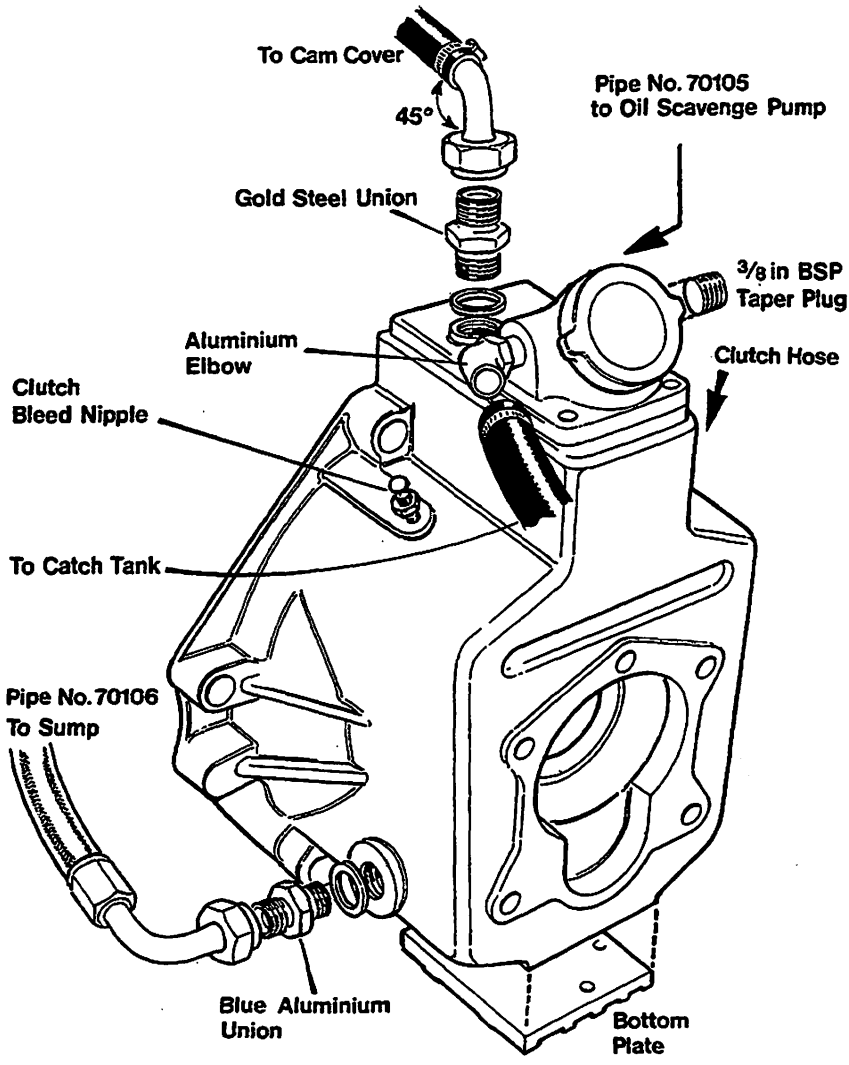


Figure 7.2 Vauxhall Dry Sump Belltank housing

7.4 Spark Plugs

The spark plugs should be removed, cleaned and inspected at the 6,000 mile service, and replaced at 12,000 miles. After a period of use, the plugs become fouled up with carbon and must be cleaned. The only really satisfactory way of doing this is by means of a plug cleaning machine. Whilst the end of the plug can be cleaned reasonably well with a wire brush, the interior cannot.

When the plug has been cleaned, reset the gap between the centre electrode and the outer electrode to 0.025" or 0.6mm by bending the outer electrode only. When correctly set, the feeler gauge should just push into the gap, no force being needed, but without play.

7.5 Carburettor Security and Adjustment

The only adjustments required on Twin Weber carbs are synchronisation, mixture strength and idling speed. These adjustments are effected by the idle speed adjustment screw, the interconnecting throttle arm screw (or balance screw) and the four idling mixture volume adjustment screws (or mixture screws). See figure 7.5 for clarification. These adjustments are the same for Weber 45 DCOE and Weber 48 DCO-SP Carburettors.

The carburettors should be set-up as follows:-

a) Ensure that the engine has reached its normal running temperature. The warmer the engine the easier the adjustment will be.

b) Check that there are no air leaks at the 'O' ring gaskets.

c) Set all four mixture screws approximately 2 full turns open.

d) Adjust the rear carburettor idle screw to give approximately 1000 rpm.

e) Synchronize the carburettors by following this procedure:-
Remove the two air filters, then using a proprietary carburettor balancing tool - a good quality one is available from Caterham under part number 98001.000 - adjust the balance screw until the air flow through each carburettor is the same.

f) Adjust each mixture screw in turn. One at a time, screw each one right in and unscrew a small amount at a time (not more than 1/8 turn) waiting approximately 5 seconds at each setting. A point will be found which will cause a rise in engine revolutions and continued unscrewing beyond that point will cause the revolutions to drop back again. Each screw must be adjusted to give the maximum rise in revolutions.

NOTE: during the course of items e) and f) it will be necessary to re-adjust the idle speed adjustment screw from time to time to maintain the engine revolutions at around 1000 rpm.

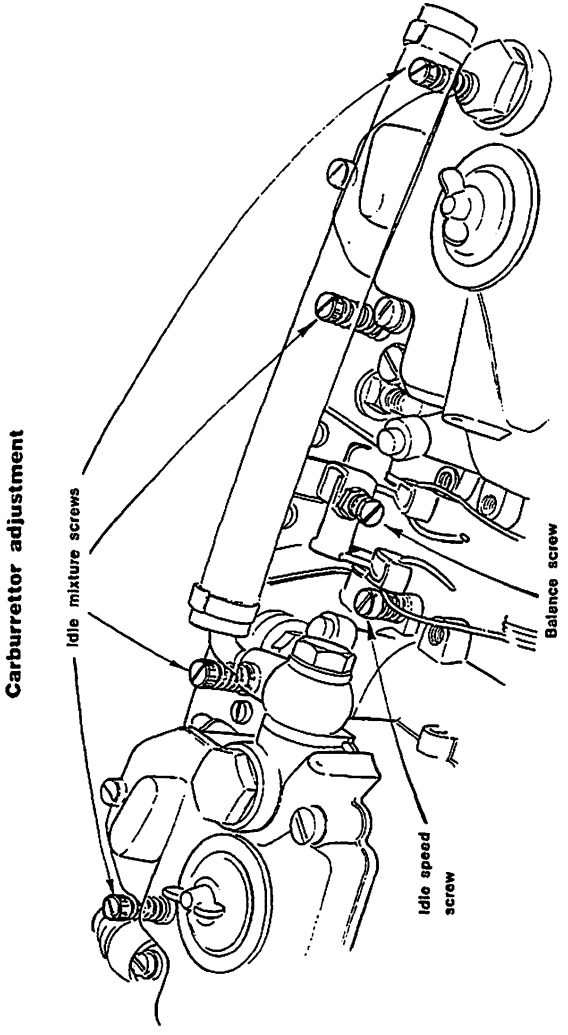


Figure 7.5 Carburettor Adjustment Points

g) Repeat d), e) and f) (possibly several times) until no further improvements can be obtained.
h) Adjust the idle speed adjustment screw to give an idle of 900 to 950 rpm.
The twin DCOE Webers are held onto the manifold using special anti-vibration grommets to prevent engine vibration from causing frothing of fuel in the float chambers. These grommets are sandwiched using captive washers and the correct gap between them should be between 0.015" and 0.025" (0.38mm and 0.64 mm). Adjust this gap by tightening or loosening the 5/16" half nyloc UNF nuts which hold the carburettors onto the manifold.

7.6 Engine Management System

All Vauxhall engines are fitted with fully programmed electronic ignition, The standard Bosch system being used on an injected car and a special MBE ignition unit being used on a carburettor engine. The Bosch system also controls all the fuel injection system functions. These systems do not have any facility for user adjustment, but in the case of the Bosch system, can be checked using Vauxhalls' 'Tech 1' diagnostic equipment which all Vauxhall dealers will have.

Pre 1993 engines use a distributor to control the high tension current, and the cap and rotor arm may be checked for contact condition or cracking. Later engines use double ended coils and hence dispense with the distributor. Take extreme care when working on this system, particularly in damp conditions.

7.7 Ancillary And Exhaust Security And Condition

It is possible with time that engine ancillaries can work loose in service, particularly in competition usage, and it is important therefore that the security of bolts holding items such as the starter motor, alternator, engine mounting brackets, carburettors and inlet manifolds are checked. Please ensure that no fittings are over tightened as it is possible to damage threads and overstress components by doing so. We include a list of all engine related torque settings at the rear of this section of the manual. You should always use a good quality torque wrench to be certain that bolts are tightened correctly.

Bolts not covered by the list should be tightened as in the following list

The exhaust system should be checked for leakage and to make certain that all clamps are properly secured. If the exhaust is leaking we recommend that you dismantle the joint concerned, clear away the cracked sealant and replace with Holts Firegum or similar. The Caterham exhaust system is made from high quality

stainless steel and therefore corrosion should not be a problem. Please refer to section 3.9 for details on catalytic exhaust systems.

Spanner Size	A/F	Metric	Torque(lb/ft)
1/4 UNF/UNC or M6	7/16	10mm	3-5
5/16 UNF/UNC or M8	1/2	13mm	12-15
3/8 UNF/UNC or M10	9/16	17mm	20-25
7/16 UNF	5/8 or 11/16		30-35
1/2 UNF or M12	3/4	19mm	40-45

7.8 Alternator Belt

There should be between 1/2" and 1" vertical movement in the alternator drive belt. If there is more than this it should be tightened by swinging the alternator away from the engine. To do this, first loosen the two 5/16" bolts holding the alternator onto its mounting bracket, then slacken the 8mm bolt holding it onto the tensioning strap. When the tension is correctly set, retighten all three alternator mountings and recheck the tension to ensure it has not slipped during tightening.

If the belt shows any signs of wear or fraying it must be replaced.

7.7 Cooling System

The water level in the cooling system should be maintained so that the expansion tank is filled to between its maximum and minimum marks.

When the engine is hot, expansion may allow the overflow level to rise slightly but this should return to normal when the engine cools. DO NOT remove the radiator cap from a hot engine,as there is considerable danger from scalding as a result of escaping steam and fluid. With a cool engine, remove the expansion bottle cap and check the level, topping up with clean water and antifreeze if necessary. Antifreeze containing a corrosion inhibitor should be maintained at a 33% proportion.

If the cooling system has needed topping up or has been re-filled with fresh coolant, it will need to be bled from the bleed screw in the top of the radiator in order to ensure there is no air in the system.

Check all rubber hoses regularly, including those to the heater if fitted and ensure that connecting clips are tight and that any hoses showing signs of splitting or swelling are replaced.

7.8 Clutch Adjustment

The clutch cable is adjustable at both the bellhousing and pedal box ends and should be set such that the minimum length of outer cable intrudes into the pedal box. This will minimise the strain on the cable caused by the arc of movement of the clutch pedal.

The 'bite' point can be set according to personal preference but care should be taken to ensure it is not so adjusted as to prevent the clutch from fully engaging causing slipping (high pedal) or from fully disengaging causing difficulty in engaging gears (low pedal). (see Fig. 4.2.11)

7.9 Air Cleaner

The panel type air filter element on an injected car should be replaced every 12,000 miles. The housing is held together with three over-centre clips, which when released, allow the housing to be split for element replacement.

Injected cars can also be fitted with a K&N filter which normally does not require replacement before 30,000 miles, and even then may only need cleaning. We recommend that it is checked and cleaned at regular service intervals however.

Carburettor cars are fitted with K&N filters as standard which again do not need maintenance until 30,000 miles. These can be dismantled and the elements cleaned or replaced as required. Please note that the 48's use a larger filter than the 45's.

7.10 Carburettor Fuel Filters

Weber DCOE and DCO-SP carburettors are each fitted with a small filter in the top of each unit adjacent to where the fuel union is joined to the carburettor body.

Remove the 19mm brass bolt and lift out the small filter from underneath. These filters should be thoroughly cleaned with paraffin and ideally blown dry with an airline.

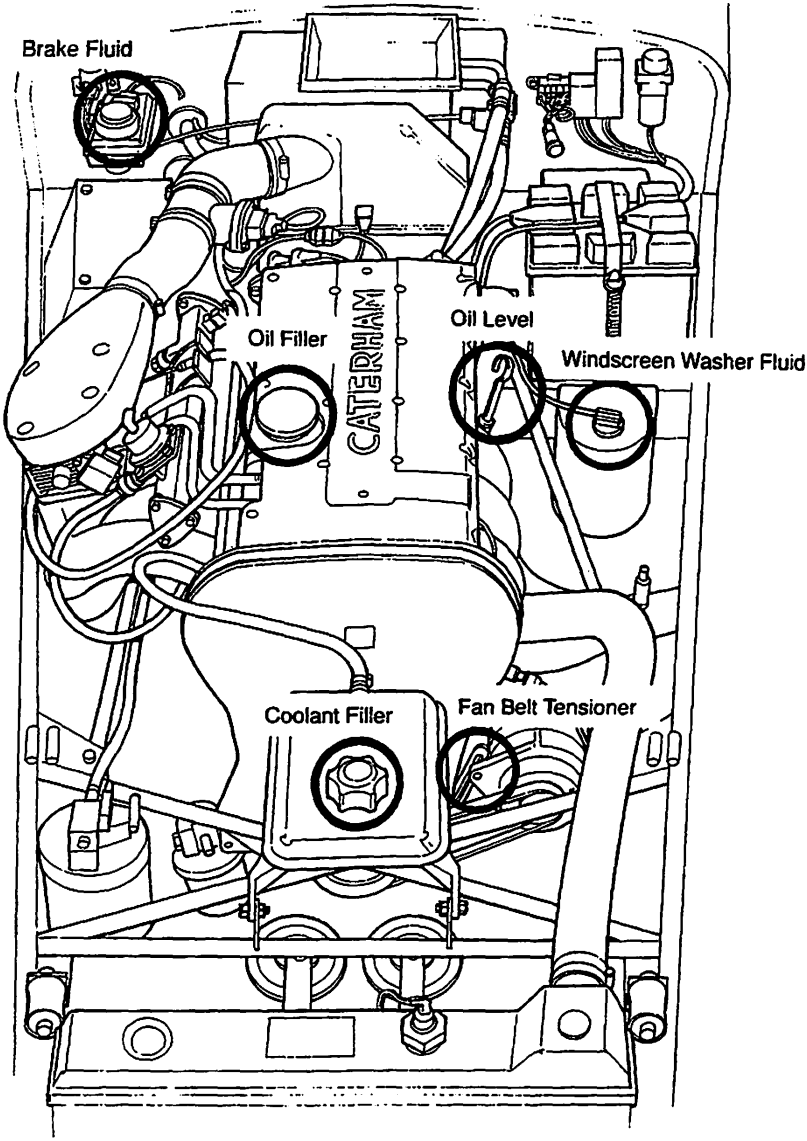


Figure 7 Underbonnet Service Locations - Vauxhall Engine

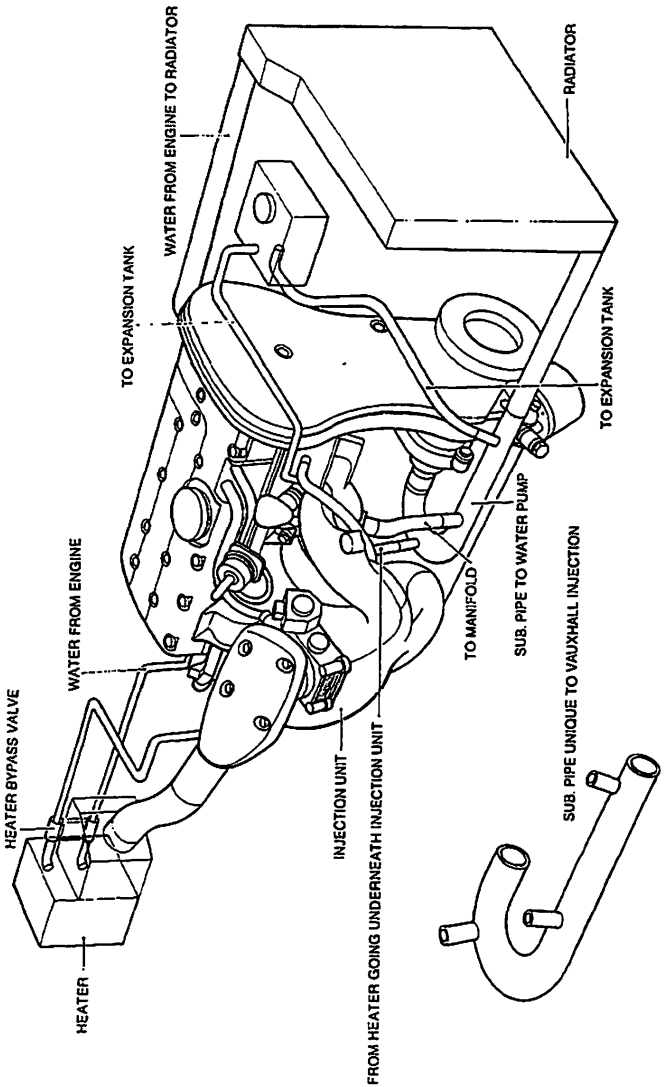


Figure 7.1.1 Cooling System - Vauxhall Injection Engine

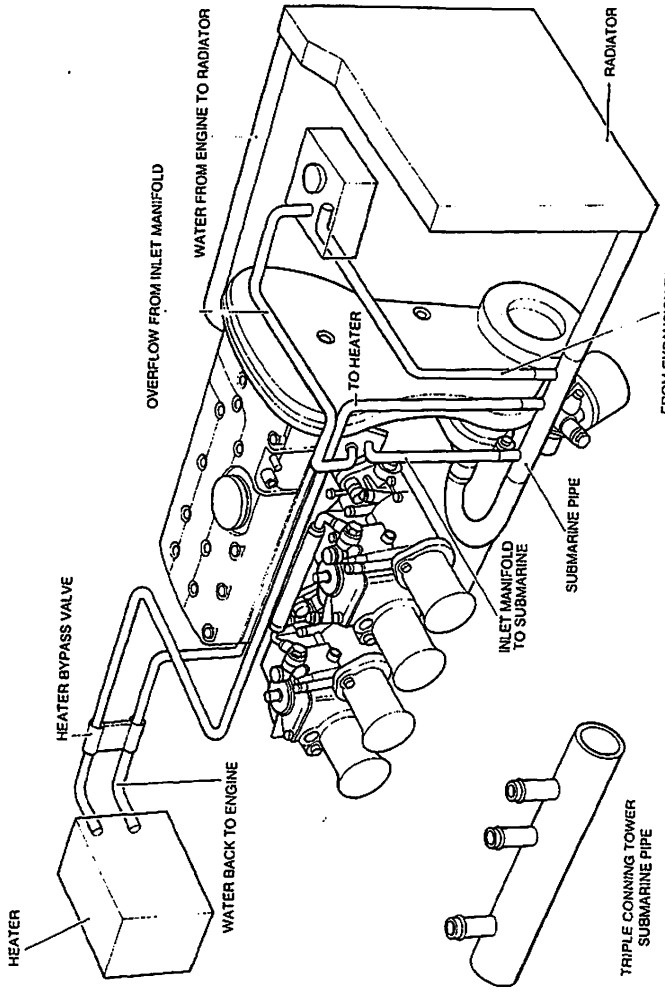


Figure 7.1.2 Cooling System - Vauxhall Carburettor Engine

Vauxhall Engine Bolt Torques

Bolt Size	Usage	Torque
M12 x 40mm	Gearbox to bellhousing	45 lbft
M6 x 16mm	Belltank top plate	5 lbft
M12 x 110mm	Dry sump belltank to gearbox	45 lbft
M12 x 40mm	Engine to bellhousing	45 lbft
M12 x 60mm	Engine to bellhousing	45 lbft
5/16"UNF x 1 3/4"	Engine mount rubber to chassis	12-15 lbft
5/16"UNF x 1"	Gearbox mount to chassis	12-15 lbft
M12 x 25mm	Gearbox mount to gearbox	45 lbft
M10 x 25mm	Left engine mount	25 lbft
M10 x 45	Left and Right engine mount	25 lbft
1/2"UNF x 2 1/2"	Mounting brackets to rubbers	12-15 lbft
5/16"UNF x 5"	Alternator	12-15 lbft
5/16"UNF x 1 3/4"	Upper engine bay diagonals	25 lbft
M8 x 25mm	Alternator to strap	12-15 lbft
M10 x 60mm	Cats cradle to bellhousing	25 lbft
M10 x 45mm	Cats cradle to block	25 lbft
5/16"UNF x 1 3/4"	Cats cradle to manifold	12-15 lbft
5/16"UNF x 3/4"	Exhaust bracket	12-15 lbft
M8 nuts	Exhaust manifold	12-15 lbft
5/16"UNF x 3 1/2"	Expansion tank support	12-15 lbft
1/4"UNF x 3/4"	Expansion tank brackets	8 lbft

SECTION 8

SERVICE INFORMATION - ROVER K SERIES ENGINE

8.1 Change of Oil and Filter

To drain the oil from the engine it is important that the engine is warmed first in order that the oil will drain more thoroughly. Remove the oil filler cap and remove the sump drain plug using a 3/4" AF spanner.

REMEMBER TO PUT A SUITABLE RECEPTACLE UNDER THE SUMP.

The filter is removed using a chain wrench, bearing in mind that unscrews in an anticlockwise direction when viewed end on. Before fitting the new filter, apply a thin film of oil to the rubber seal. This will ensure a better oil tight seal to its aluminium housing. The filter should be done up hand tight only as use of the wrench can cause overtightening and damage to the aluminium casting.

Replace the sump plug, tightening to 15 lb ft and refill with new oil, checking that the correct (recalibrated) level is marked on the dip stick by a notch cut in either side of the yellow plastic dipstick arrow.

Caterham Cars recommend the use of a premium motor oil such as BP Visco 2000 or Mobil 1. Replace the oil filler cap. Remove the spark plugs and turn over the engine on the starter motor until pressure shows on the oil pressure gauge. Check the engine for leaks before starting it.

Every 6,000 miles the Rover foam sump insert needs to be changed, to ensure it doesn't break up or become clogged. Remove the sump pan by releasing the 14 caphead bolts and lower it off, removing the wolverine gasket and the aluminium baffle plate with it. Inspect the baffle plate and the (re-usable) gasket for damage, put a new foam insert in place, and refit the assembly, torqueing the bolts to 6 lbft.

8.2 Hydraulic Tappets

All Rover K series engines, except race specification 1400 Supersports, have hydraulic tappets which will not require adjustment at any stage. Race specification Supersports are upgraded to mechanical tappet specification which are set with the use of shims, we recommend mechanical tappet adjustment (should it prove necessary) is completed by experts. Adjustment will not be a normal service requirement.

8.3 Spark Plugs

The spark plugs should be removed, cleaned and inspected at the 6,000 mile service, and replaced at 12,000 miles. After a period of use, the plugs become fouled up with carbon and must be cleaned. The only really satisfactory way of doing this is by means of a plug cleaning machine. Whilst the end of the plug can be cleaned reasonably well with a wire brush, the interior cannot.

When the plug has been cleaned, reset the gap between the centre electrode and the outer electrode to 0.025" or 0.6mm by bending the outer electrode only. When correctly set, the feeler gauge should just push into the gap, no force being needed, but without play.

8.4 Engine Management System

The Rover K Series engines all use Rovers own 'MEMS' engine management system, which controls all ignition and injection functions. If you suspect the engine is not running properly in any way, the car should be brought to Caterham Cars, one of our service agents, or any Rover dealership where it can be checked with the correct diagnostic equipment. This equipment is called 'Micro-Check' and the K series engine used in a Caterham (whether standard or Supersport specification) is the Multi Point injected version.

The high tension current from the coil to the spark plugs is controlled by a distributor, and the contacts within the cap and the rotor arm should periodically be checked to ensure they are in good order. Should there be any signs of burning, scoring or cracking the relevant component should be replaced.

8.5 Ancillary And Exhaust Security And Condition

It is possible with time that engine ancillaries can work loose in service particularly under competition usage and it is important therefore that the security of bolts holding items such as the starter motor, alternator, engine mounting brackets, carburettors and inlet manifolds are checked. Please ensure that no fittings are over tightened as it is possible to damage threads and overstress components by doing so. We include a list of all engine related torque settings at the rear of this section of the manual. You should always use a good quality torque wrench to be certain that bolts are tightened correctly.

Bolts not covered by the list should be tightened as follows

Spanner Size	A/F	Metric	Torque(lb/ft)
1/4 UNF/UNC or M6	7/16	10mm	3-5
5/16 UNF/UNC or M8	1/2	13mm	12-15
3/8 UNF/UNC or M10	9/16	17mm	20-25
7/16 UNF	5/8 or 11/16		30-35
1/2 UNF or M12	3/4	19mm	40-45

The exhaust system should be checked for leakage and to make certain that all clamps are properly secured. If the exhaust is leaking we recommend that you dismantle the joint concerned, clear away the cracked sealant and replace with Holts Firegum or similar. The Caterham exhaust system is made from high quality stainless steel and therefore corrosion should not be a problem. Please refer to section 3.9 for details on catalytic exhaust systems.

8.6 Alternator Belt

There should be between 1/2" and 1" vertical movement in the alternator drive belt. If there is more than this it should be tightened by swinging the alternator away from the engine. To do this, first loosen the two 10mm bolts holding the alternator onto its mounting bracket, adjust the tension by screwing in the 10mm tensioning bolt situated at right angles to the alternator, which will move the alternator away from the engine. When the tension is correctly set, retighten the two alternator mountings and recheck the tension to ensure it has not slipped during tightening.

If the belt shows any signs of wear or fraying it must be replaced.

8.7 Cooling System

The water level in the cooling system should be maintained so that the expansion tank is filled to between its maximum and minimum marks.

When the engine is hot, expansion may allow the overflow level to rise slightly but this should return to normal when the engine cools. DO NOT remove the radiator cap from a hot engine,as there is considerable danger from scalding as a result of escaping steam and fluid from the pressurised system. With a cool engine, remove the expansion bottle cap and check the level, topping up with clean water and antifreeze if necessary. Antifreeze containing a corrosion inhibitor should be maintained at a 33% proportion.

If the cooling system has needed topping up or has been re-filled with fresh coolant, it will need to be bled in order to ensure there is no air in the system. To do this, follow this sequence:-

a) Top up the system at the following points, expansion tank, radiator bleed screw, and heater connections (if fitted)

b) Run the engine with the heater on, without letting it get too hot, with the bleed screw on the radiator loosened to allow air to escape. Tighten when no more air is escaping.

c) With a helper, slacken the upper connection to the heater so that air can escape, without fully disconnecting the hose. When only water is escaping without any air content, push the hose back onto the heater and re-tighten the jubilee clip.

d) Keep the expansion tank topped up at all times.

e) Check for water being returned to the top of the expansion tank, if present, the system is fully bled.

f) Check all the hose connections for security

Check all rubber hoses regularly, including those to the heater if fitted and ensure that connecting clips are tight and that any hoses showing signs of splitting or swelling are replaced.

8.8 Clutch Adjustment

The clutch cable is adjustable at both the bellhousing and pedal box ends and should be set such that the minimum length of outer cable intrudes into the pedal box. This will minimise the strain on the cable caused by the arc of movement of the clutch pedal.

The 'bite' point can be set according to personal preference but care should be taken to ensure it is not so adjusted as to prevent the clutch from fully engaging causing slipping (high pedal) or from fully disengaging causing difficulty in engaging gears (low pedal). (see Fig. 4.2.11)

8.9 Air Cleaner

The panel type air filter element on a standard K series car should be replaced every 12,000 miles. The housing is held together with three over-centre clips, which when released, allow the housing to be split for element replacement.

Supersport cars are all fitted with a K&N filter which normally does not require replacement before 30,000 miles, and even then may only need cleaning. We

recommend that it is checked and cleaned at regular service intervals however. This filter can be fitted to all K series engines.

Rover Engine Bolt Torques

5/16"UNF x 1 3/4"	Engine mounting rubbers	12-15 lbft
M10 x 55mm	Right Hand Engine Mount	25 lbft
M10 x 30mm	Left hand engine mount	25 lbft
1/2"UNF x 2 1/2"	Mounting bracket to rubbers	45 lbft
5/16"UNF x 3/4"	Exhaust bracket	12-15 lbft
5/16"UNF x 3 1/2"	Expansion tank support	12-15 lbft
1/4"UNF x 3/4"	Expansion tank brackets	8 lbft
5/16"UNF x 1 3/4"	Upper engine bay diagonals	12-15 lbft

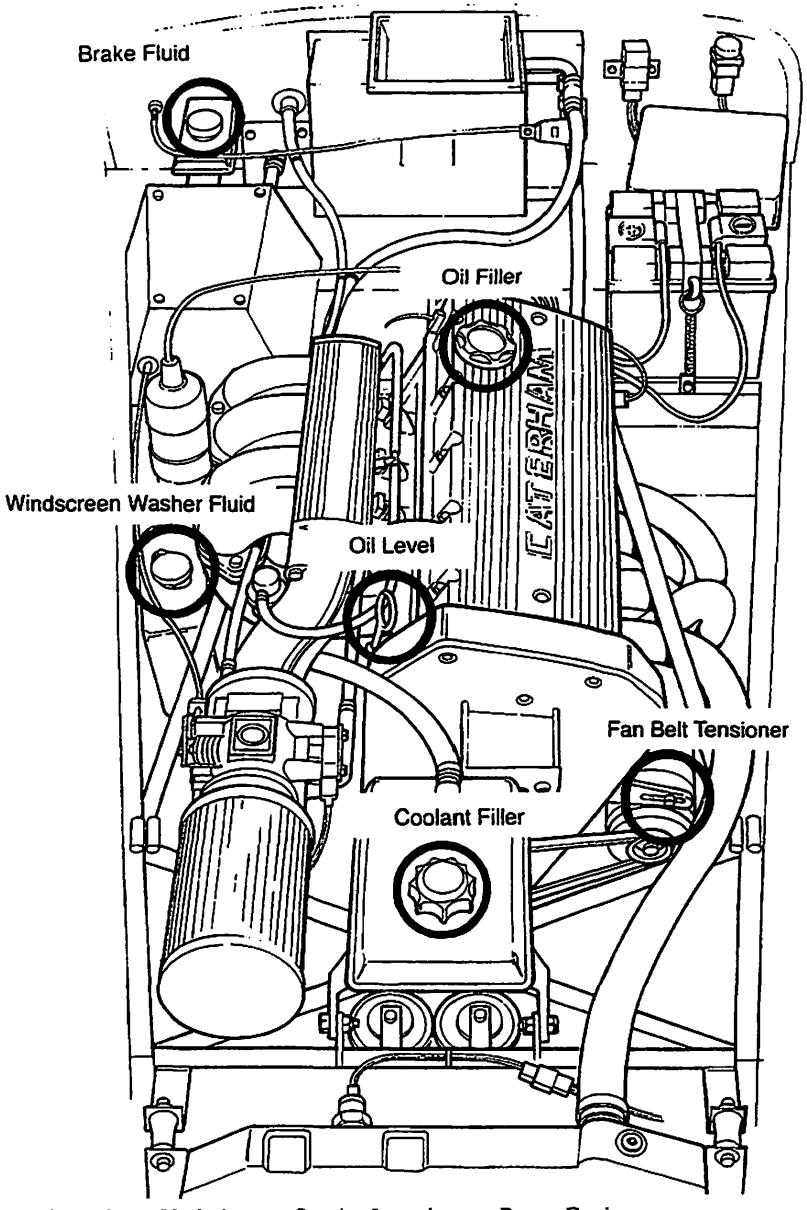


Figure 8 Underbonnet Service Locations - Rover Engine

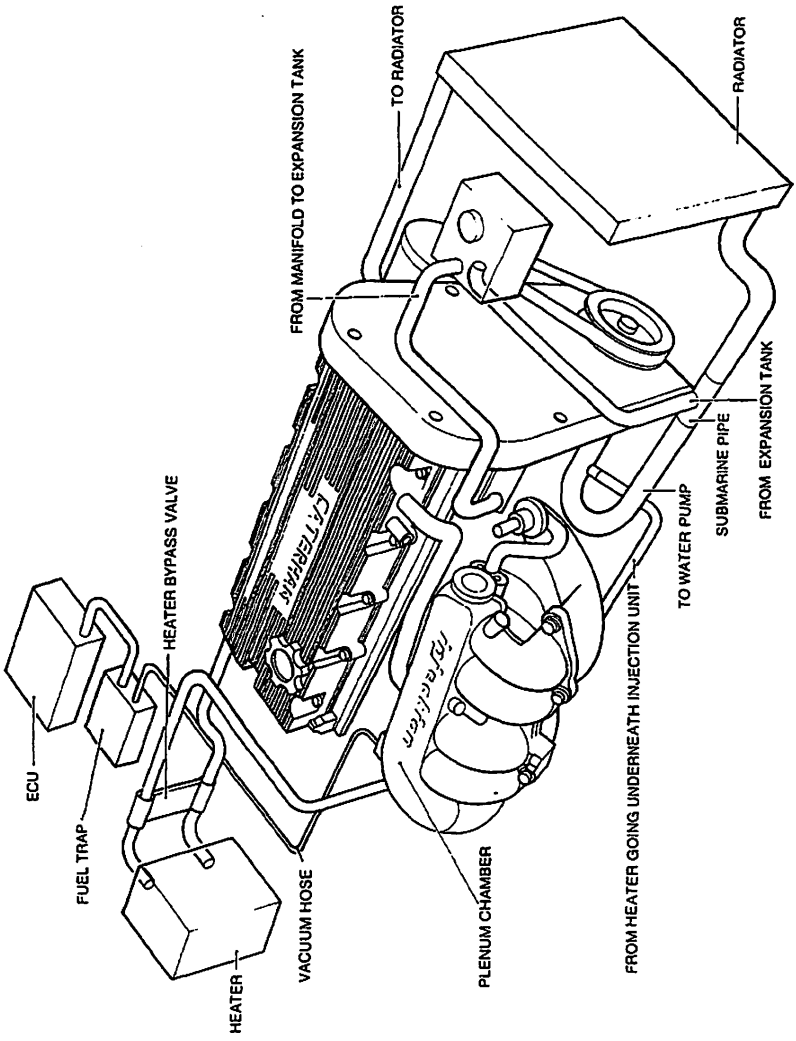


Figure 8.7 Cooling System - Rover Engine

SECTION 9

SERVICE INFORMATION - GEARBOX AND DIFFERENTIAL

9.1 Gearbox Oil Level

The gearbox oil level (4, 5 or 6 speed) is checked by removing the filler plug situated on the left hand side. The oil should be level with the bottom of this hole. Five and six speed gearboxes should be topped up with Ford type 9 gearbox oil, Ford part number 5015547, which is available from all Ford garages. Alternatively BP synthetic gearbox oil can be used.

The gearbox is a very close fit in the transmission tunnel and therefore the oil filler plug is difficult to get to, in particular with 5 speed cars. We suggest that you use a cut down 10mm Allen key for this.

Four speed gearboxes should be filled with EP80 gearbox oil. Caterham Cars use BP oils at the factory.

None of the gearboxes will need routine oil changes. Nevertheless, the six speed gearbox does have a drain plug for those owners who wish to change their oil.

9.2 Differential Oil Level

The oil level is checked by removing the filler plug situated on the back of the differential casing with a 10mm Allen key. The oil level should be topped up to the bottom of the filler hole with the car level. EP90 gear oil should be used. Caterham Cars use BP oils at the factory.

9.3 Rear Axle Oil Level

The oil level on Ital axled cars is checked by removing the filler plug situated on the back of the differential casing with a 5/16" spanner. Top up using EP9O oil. Caterham Cars use BP oils at the factory.

SECTION 10

FAULT DIAGNOSIS

A properly maintained car is unlikely to give any trouble during its working life, but appreciating that problems might occur at some point, the following section has been prepared to help with fault diagnosis

10.1 Starting The Engine

a) Engine fails to turn over when key start operated, ignition light inoperative

Fault	Remedy
Disconnected battery lead	check battery lead connections, clean if corroded and tighten, check engine earth lead
Battery discharged	Recharge battery or replace if defective
Faulty starter motor (if light works)	check connections, replace

b) Engine turns over very slowly, lights dim

Fault	Remedy
Loose battery or starter terminals	check battery terminals, engine earth strap and starter solenoid, clean if corroded and tighten
Battery partially discharged	Recharge battery, car can be started with jump leads

c) Engine turns over but will not fire, no spark at plugs

Fault	Remedy
Ignition damp or wet	wipe dry ignition leads and distributor cap or spray with damp start or WD40
Loose HT leads	Check security of all HT leads
Loose or shorted low tension leads	Check wiring to both terminals on coil and to distributor
Defective contact breaker points	Clean and check points gap, replace if necessary

Defective ignition switch	Temporarily by pass with electric cable, replace
Defective condenser	Check points for arcing, replace if necessary
Defective vane switch (electronic ignition)	replace

d) Engine turns over but will not fire, spark at plugs

Fault	Remedy
Insufficient fuel	Check fuel gauge reading and tank contents, refill
Engine flooded by excess fuel	With accelerator pedal fully depressed (carb. cars only) turn engine over for up to 20 second bursts. Alternatively remove spark plugs and clean and dry
Insufficient fuel supply to carbs	Fuel supply lines blocked; carb fuel filters blocked; fuel pump inopperative, check pump, relay (injection), connections and fuse

e) Engine is difficult to start, spark at plugs and good fuel supply

Fault	Remedy
Incorrect starting procedure	See correct procedure in section 3.6
Poor ignition	Check all ignition system parts and connections
Incorrect ignition timing or firing order	set the ignition timing and the HT lead fitment
Low cylinder compressions	Check valve clearances. If correct seek professional help

f) Starter motor spins but doesn't turn engine

Fault	Remedy
Faulty solenoid	Check connections, replace starter

10.2 Engine Running

a) Engine stalls and will not restart

Fault	Remedy
Ignition failure	-Check all low tension and HT connections -check points, condenser, cap etc. if preceded by misfiring -dry out distributor and leads if damp
Sudden fuel shortage	check fuel filters, pump and fuel level

b) Engine overheating

Fault	Remedy
Low coolant level	Allow to cool, top up and check for leaks
Air lock in system (Vauxhall & Rover)	Allow to cool, top up and thoroughly bleed cooling system
Loose or broken alternator belt (Ford)	tighten or replace
Defective water pump	replace
Coolant hose burst, disconnected or collapsed	reconnect or replace, top up coolant
Defective thermostat not opening and restricting flow	remove temporarily, test and replace
Electric cooling fan not working	check electrical connections, fuse and fan switch
Blown cylinder head gasket	seek professional help
Excessive ignition advice	Reset ignition timing

Please note that if your engine is overheating for any reason, you should switch off and allow to cool before proceeding further. If possible top ip the system then drive the car slowly to a place wher it can be repaired. Do not under any circumstances continue to drive a car with an overheating engine, or the engine may be considerably damaged.

c) Smoke or steam rising from under bonnet

Fault	Remedy
Wet conditions, water on exhaust	Not a concern
Steam escaping from cooling system	See overheating

Electrical short circuit	Stop at once, switch off ignition and battery switch if fitted, and disconnect battery
Major oil leak, oil on exhaust	Stop at once, clean off oil, stop the leak and check oil level

d) Low oil pressure

Fault	Remedy
Low pressure under braking or cornering due to oil surge	Top up oil to the correct level
Low oil pressure at idle, hot oil	Not a cause for concern, providing it doesn't drop below 2 bar, and rises quickly with engine speed
Poor earth causing false reading	Check all earthing points
Low oil pressure when running normally	seek professional help

e) Oil pressure suddenly drops while running

Fault	Remedy
Loose connection on sender unit, switch or gauge	SWITCH OFF IMMEDIATELY and check connections
Leakage from oil filter,oil cooler or pipes	SWITCH OFF IMMEDIATELY and repair or replace
Insufficient oil in engine	SWITCH OFF IMMEDIATELY check oil level and fill as necessary

If the problem cannot be traced to any of these faults, it is likely that there is a major problem with the engine. UNDER NO CIRCUMSTANCES DRIVE A CAR WITH NO OIL PRESSURE.

f) Abnormal smoke from exhaust

Fault	Remedy
Over filled sump (blue smoke)	check oil level and drain as necessary
Worn valve guides or piston rings (Blue smoke)	Seek professional help
Blown head gasket (White smoke)	Seek professional help

10.3 Electrical Problems

a) Windscreen wipers not operating

Fault	Remedy
Blades stuck to screen by ice	free wiper blades before using wipers
Blown fuse, poor electrical connection	change fuse, check electrical connections

b) Lights or indicators not working on one side

Fault	Remedy
Blown bulb, loose connection or poor earth	Replace bulb, and check clean and tighten connections

c) Lights or indicators not working on both sides

Fault	Remedy
Blown fuse, faulty switch or faulty flasher unit	Check all connections, replace fuse, flasher unit or switch as required
Indicators not working	Check position of hazard switch, this should be fully off

d) Ignition warning light does not go out, battery flattens over a few days

Fault	Remedy
Loose or broken alternator belt	Tighten or replace
Faulty alternator or poor connections	Check all alternator connections, replace if required

In our experience over 90% of electrical problems are caused by poor earth connections and therefore if you suffer a problem, check the vehicle earthing points which are as follows:

a) Battery lead to engine block to bellhousing bolt on most models
b) Engine block to chassis at engine mounting rubber retaining bolt
c) Front lights to chassis at 3 way brake union
d) Instrumentation to chassis (at wiper motor securing bolt under dashboard)
e) Rear lights to chassis (to rear wing securing bolts)

At the rear of this section are wiring diagrams for the various engine options along with a diagram of the fuse box and relays.

10.4 Steering Suspension and Braking Problems

a) Car pulls to one side

Fault	Remedy
Incorrect tyre pressures or tracking	Check and adjust
Damaged Suspension	Seek professional help

b) Car pulls to one side under bracking

Fault	Remedy
Brake pads contaminated with brake fluid	Check source of fluid leak and repair, replace pads
Seized or leaking brake calliper	seek professional help
Suspension mountings loose	Check and tighten
Faulty spring or damper	Seek professional help

c) Brake pedal travel excessive

Fault	Remedy
Brake fluid level too low, possible leak in system	Check for leaks, tighten unions if necessary and replace any defective components. Top up fluid and bleed to remove air
Air in hydraulic system	Check system for leaks and bleed
Excessive brake pad wear	Replace worn pad
Rear drums out of adjustment	Check brake shoes and adjust

d) Brake pedal soft or spongy

Fault	Remedy
Leak in system	Check, top up and re- bleed system
Air in system	As above
Fluid contaminated with water	Replace fluid

e) Brakes binding

Fault	Remedy
Handbrake cable over tightened	Slacken off and re-adjust
Vent hole in fluid reservoir cap blocked	Remove cap and clean hole
Brake calliper pistons seized	Seek professional help

f) Wheel wobble at speed

Fault	Remedy
Wheels out of balance, damaged or loose	Re-torque wheel nuts, check wheels and balance if necessary
Front hub bearings worn or loose	Adjust or replace bearings
Front trunnions, steering or suspension joints worn or loose	Replace worn joints and re-torque all the suspension joints

g) Free play in steering

Fault	Remedy
Track rod ends worn	Replace and reset tracking
Steering rack loose in its mountings	Tighten mounting bolts and grub screws
Upper to lower steering column clamp assembly loose	Slacken locknut, tighten grub screw and re-tighten locknut
Play in steering column U.J.	Tighten fixing bolts and replace if play persists
Play in steering rack	Seek professional help

SECTION 11

COMPETING IN YOUR CATERHAM SEVEN

Due to the difficulty - and illegality - of using the Caterham Sevens full power on the public roads, many owners choose to use their cars in competition events, such as circuit racing, sprints and hillclimbs, as well as non-competitive track days.

As an introduction to motorsport, Caterham Cars introduced the 'Top gear Motorsport Scholarship' in 1995, using 25 identical live axle cars, the series covers a range of events, from autotests to hillclimbs and races.

Caterham Cars run two circuit racing championships in conjunction with the British Racing and Sports Car Club (BRSCC), the Caterham K Series and Caterham Vauxhall Challenges. Both of these have been designed to promote close and cost-effective racing by virtue of the strict regulations and the use of sealed engines.

The K series championship is for roadgoing K series cars and is an ideal starting point for novice competitors looking for fun motorsport. The Caterham Vauxhall challenge cars are aimed at the more experienced competitor and are amongst the fastest one-make racecars in Europe, running on slick tyres with 188BHP and weighing only 525kg. Both of these series are administered by Entreprix, whom you should contact for further details (address at end of section).

The 750 Motor Club also run championships and race events for which the Caterham Seven is eligible and highly competetive.

Caterham Sevens are also highly popular for hillclimb and sprint events, from club to national level. These events are run solely against the clock, with one car on the course at a time and the entry split into a range of classes.

The R.A.C. Motor Sports Association (RACMSA)is responsible for most forms of motor sport in the U.K., including all the above, and in order to compete, a competition license must be held. To hold a 'speed' license for hillclimb and sprint events you only need to pay the relevant fee. For a race license however a one day ARDS driving course must be completed and you will need to pass a medical examination with a doctor. Full details can be obtained from the RACMSA.

Track driving days are generally organised by the relevant club, be it an owners club or a track driving club such as Club 89 without involving the RACMSA. Contact the organising body for details of these events.

Safety equipment requirements vary greatly between the levels of events, from track days where you simply need a crash helmet, to a Caterham race where full fireproof clothing is required along with full safety equipment. Check with the RACMSA and the event organisers as to exactly what is required.

For any form of track use we would recommend the following safety equipment as a minimum :
-Full harness safety belts (6 point not 4 point)
-F.I.A. roll over bar with head restraint
-Ignition cut out switch
-Handheld or plumbed in fire extinguisher
-Honeycomb fuel tank and floor impact protection panels
-Engine restraints
-Twin throttle return springs
-Flush fuel filler (standard on injected cars)

The following addresses may be useful

Caterham Cars Ltd.
Unit 2
Kennet Road
Dartford
Kent
DA1 4QN
Tel 01322 559124
Fax 01322524278

Hyperion Motorsport
Official Caterham Motorsport Agents
3 Sudbury Road
Little Maplestead
Halstead
Essex
CO9 2SE
Tel 01787 478800

RAC Motor Sports Association
Motor Sports House
Riverside Park
Colnbrook
Slough
SL3 0HG
Tel 01753 681736
Fax 01753 682938

Entreprix
Race and series administrators
Contact Bellinda McDougall
20 Louies Lane
Diss
Norfolk
IP22 3LR
Tel/Fax 01379 640065

British Racing and Sportscar Club
Race Organisors
Brands Hatch Circuit
Fawkham
Dartford
DA3 8NH
Tel 01474 874445

750 Motor Club
Race series organisors
Contact Robin Knight
West View
New Street
Stradbroke
Suffolk
IP21 5JG
Tel 01379 384268

Club 89
PO Box 89
Bury St. Edmunds
Suffolk
IP33 1HJ
Tel 01284 700189
Fax 01284 700989

SECTION 12

TECHNICAL SPECIFICATION

CATERHAM SUPER SEVEN DE DION AND LIVE AXLE MODELS

VEHICLE TYPE

2 seater, convertible sports car, no doors.

CONSTRUCTION

Tubular steel space frame.
Aluminium panels with aluminium honeycomb cockpit side impact protection.
Glass fibre re-inforced plastic nose-cone and wings.

BRAKING SYSTEM

Twin circuit, equal split front/rear, with system warning of low fluid level.
De Dion - Discs front and rear
Live axle - Discs front, drums rear

Front discs (live axle & standard De Dion)	Disc Diameter:	9.0 in (229 mm)
	Pad area:	14.7 in2 (9500 mm2)
	Swept area:	149.0 in2 (96700 mm2)
Rear discs (Standard De Dion)	Disc Diameter:	9.0 in (229 mm)
	Pad area:	14.0 in2 (9500 mm2)
	Swept area:	149.0 in2 (96700 mm2)

Uprated A.P. Racing brake option (De Dion only):-

Front	10" ventilated discs with aluminium 4 pot calipers
Rear	9" solid discs with aluminium 2 pot calipers

Rear Drums (De Dion pre' 88)	Drum Diameter	8.0 in (203 mm)
Rear Drums (Ital Axle-long cockpit)	Drum Diameter	8.0 in (203 mm)

Parking brake operating on rear wheels, actuated by hand lever.

STEERING

Mechanism	Rack and Pinion	
Turns lock to lock	Clamshell wings	2.75
	Cycle wings pre'-mid 1994	2.25
	8% quick rack (flared & cycle)	2.13
	22% quick rack	1.80

SUSPENSION

Front (De Dion)	Double wishbones (adjustable), anti-roll bar	
	Springs	Coil
	Dampers	Bilstein telescopic
Rear (De Dion)	De Dion axle Located by lower 'A' frame and radius arms, adjustable anti-roll bar	
	Springs	Coil
	Dampers	Bilstein telescopic
Front (Live axle):	Lower wishbone and upper link, anti-roll bar	
	Springs	Coil
	Dampers	Spax telescopic (adjustable)
Rear (Live Axle)	Live axle located by lower 'A' Frame and radius arms	
	Springs	Coil
	Damper	Spax telescopic (adjustable)

WHEELS AND TYRES

Live axle	Wheels	5 1/2J x 13" Steel or aluminium alloy
	Tyres	185/70 HR 13 (20 psi)
De Dion	Wheels	6J x 14" Aluminium Alloy
	Tyres	185/60 HR 14 (20 psi)
Or (Prisoner)	Wheels	6 1/2J x 15" Aluminium Alloy
	Tyres	195/50 VR 15 (18 psi)
Or	Wheels	7J x 16" Aluminium Alloy
	Tyres	205/45 VR 16 (16 psi)

ELECTRICAL

12 Volt, Negative earth

Alternator output:	45 amperes	
Battery Capacity	(Torque Starter):	40 amp/hrs
	(Banner):	30 amp/hrs

DIMENSIONS

Wheelbase	88.5 in	2250 mm
Front Track	50.0 in	1270 mm
Rear Track	52.5 in	1335 mm
Overall Length	133.0 in	3380 mm
Overall Width	62.0 in	1575 mm
Overall Height (Hood Up)	44.0 in	1115 mm
Overall Height (Hood Down)	39.0 in	990 mm
Minimum Ground Clearance	4.0 in	102 mm
Turning Circle (Between Kerbs)	30.0 ft	9.1 M
Turning Circle (Between Walls)	31.0 ft	9.5 M
Passenger Compartment Internal Width	36.6 in	930 mm
Seat to Roof Height	33.0 in	838 mm
Luggage Compartment Capacity	4.2 cu ft	120 ltr

WEIGHTS

Kerb Weight Ford/Vauxhall	1302 lb	590 kg
Maximum Weight Ford/Vauxhall	1808 lb	850 kg
Kerb Weight Rover	1213 lb	550 kg
Maximum Weight Rover	1720 lb	820 kg

FLUID CAPACITIES

Fuel Tank (Standard Road)	8.0 gal	36.3 litres
Fuel Tank (JPE)	8.0 gal	36.3 litres
Engine Oil Ford (incl Filter)	6.4 pints	3.6 litres
Engine Oil Vauxhall/Rover (incl Filter)	7.1 pints	4.0 litres
Gearbox Oil	3.4 pints	1.9 litres
Differential Oil	1.6 pints	0.9 litres
Cooling System	9.0 pints	5.1 litres
Cooling System (With Heater)	10.0 pints	5.7 litres

N.B. Cooling Capacity is 1 pint less than above for K series engines

PERFORMANCE

	0 TO 60 MPH	MAXIMUM SPEED
Rover "K"	6.7 secs	108 mph 174 kph
Rover "K" Supersport	5.9 secs	112 mph 180 kph
1600 GT	7.6 secs	100 mph 161 kph
1600 Sprint	6.5 secs	105 mph 169 kph
1700 Supersprint	5.6 secs	112 mph 180 kph
1600 BDR 16 Valve	5.3 secs	115 mph 185 kph
1700 BDR 16 Valve	4.9 secs	120 mph 193 kph
2000 Vauxhall HPC	4.9 secs	124 mph 209 kph
2000 Vauxhall JPE	3.4 secs	150 mph 241 kph

MANUAL TRANSMISSION

Gear Ratios	4 speed Classic	4 speed Sport	5 speed	6 speed
6th	-	-	-	1.00
5th	-	-	0.82	1.13
4th	1.00	1.00	1.00	1.32
3rd	1.42	1.42	1.26	1.59
2nd	2.18	1.99	1.81	2.01
1st	3.66	3.34	3.36	2.69
Reverse	4.23	3.87	3.36	2.96

Clutch Actuation, all models	Mechanical (Cable)
Except dry sump Vauxhall and some LHD	Hydraulic
Clutch Diameter (Ford and Rover)	7.5 in (190 mm)
Clutch Diameter (Vauxhall)	9 in (230 mm)
Final Drive Ratio (std. 5 or 6 speed De Dion)	3.92:1
Final Drive Ratio (4 speed live axle)	3.64:1
Mph per 1000 RPM in top (5 speed De Dion) (14")	20.3 mph (32.7 kph)
Mph per 1000 RPM in top (6 speed De Dion) (14")	16.7 mph (26.9 kph)
Mph per 1000 RPM in top (4 speed Live axle) (13")	18.5 mph (29.8 kph)

ENGINE - ROVER "K" SERIES 1400

Number of cylinders	4 in line
Firing Order	1,3,4,2.

Bore	73.00 mm
Stroke	79.00 mm
Swept Volume	1397 cm3
Compression Ratio	9.5:1
Maximum Power	Standard - 103 PS (76 KW) @ 6000 rpm Supersport - 130 PS (96KW) @ 7400 rpm
Maximum Torque	Standard - 96 lbft (13.2 Mkg) @ 5000 rpm Supersport - 100 lbft (13.7 Mkg) @ 5000 rpm
Fuel Type	Standard, with catalyst - 95 Octane (Unleaded) Supersport, with catalyst - 98 Octane (Super Unleaded) Non Catalyst - 97 Octane (4 star)
Valve Gear	D.O.H.C. 16 Valve, Hydraulic Tappets
Fuel System	Rover Multipoint Electronic Fuel Injection

ENGINE - 1600 GT

Number of cylinders	4 in line
Firing Order	1,2,4,3
Bore	80.98 mm
Stroke	77.62 mm
Swept Volume	1599 cm3
Compression Ratio	9.0:1
Maximum Power	84 PS (61.80 KW) @ 5500 rpm
Maximum Torque	91.8 lb ft (12.7 Mkg) 3500 rpm
Fuel Type	97 Octane (4 star)
Valve Gear	O.H.V. Camshaft in Cylinder Block
Fuel System	1 Twin Choke Downdraft Weber 32 DGAV

ENGINE - 1600 SPRINT

Number of cylinders	4 in line
Firing Order	1,2,4,3.
Bore	80.98 mm
Stroke	77.62 mm
Swept Volume	1599 cm3
Compression Ratio	9.0:1
Maximum Power	100 PS (80.90 KW) @ 6000 rpm
Maximum Torque	95 lbft (13.2 Mkg) @ 4800 rpm
Fuel Type	97 Octane (4 star)
Valve Gear	O.H.V. Camshaft in Cylinder Block
Fuel System	2 Twin Choke Sidedraught Weber 40 DCOE

ENGINE - 1700 SUPERSPRINT

Number of cylinders	4 in line
Firing Order	1,2,4,3.
Bore	83.30 mm
Stroke	77.62 mm
Swept Volume	1690 cm3
Compression Ratio	9.5:1
Maximum Power	135 PS (100 KW) @ 6000 rpm
Maximum Torque	122 lb ft (16.8 Mkg) @ 4500 rpm
Fuel Type	97 Octane (4 star)
Valve Gear	0.H.V. Camshaft in Cylinder Block
Fuel System	2 Twin Choke Sidedraught Weber 40 DCOE

ENGINE - 1600 COSWORTH BDR 16 VALVE

Number of cylinders	4 in line
Firing Order	1,3,4,2.
Bore	80.98 mm
Stroke	77.62 mm
Swept Volume	1599 cm3
Compression Ratio	11.0 : 1
Maximum Power	150 PS (110 KW) @ 6500 rpm
Maximum Torque	125 lbft (17.3 Mkg) @ 5500 rpm
Fuel Type	97 Octane (4 Star)
Valve Gear	16 Valve D.O.H.C.
Fuel System	2 Twin Choke Sidedraught Weber 40 DCOE

ENGINE - 1700 COSWORTH BDR 16 VALVE

Number of cylinders	4 in line
Firing Order	1,3,4,2.
Bore	83.50 mm
Stroke	77.62 mm
Swept Volume	1699 cm3
Compression Ratio	11.0 : 1
Maximum Power	170 PS (125 KW) @ 6500 rpm
Maximum Torque	140 lbft (19.3 Mkg) @ 5500 rpm
Fuel Type	97 Octane (4 Star)
Valve Gear	16 Valve D.O.H.C.
Fuel System	2 Twin Choke Sidedraught Weber 45 DCOE

ENGINE - 2000 VAUXHALL DOHC 16 VALVE

Number of cylinders	4 in line
Firing Order	1,3,4,2.
Bore	86.00 mm
Stroke	86.00 mm
Swept Volume	1998 cm3
Compression Ratio	10.5 : 1
Maximum Power	Carburettor - 177 PS (130 KW) @ 6750 rpm Injection - 165 PS (121 KW) @ 6000 rpm
Maximum Torque	Carburettor - 160 lbft (22.1 Mkg) @ 5500 rpm Carburettor - 165 lbft (22.8 Mkg) @ 4500 rpm
Fuel Type	Non-catalyst - 97 Octane (4 Star) Injection with Catalyst - 95 Octane (Unleaded)
Valve Gear	16 Valve D.O.H.C., Hydraulic Tappet
Fuel System	2 Twin Choke Sidedraught Weber 45 DCOE or Bosch Motronic Fuel Injection

SECTION 13

SERVICE HISTORY

INITIAL SERVICE 500 MILES (800 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

INTERMEDIATE SERVICE 3000 MILES OR 3 MONTHS (5000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

FULL SERVICE 6000 MILES OR 6 MONTHS (10000 K.M.)

REGISTRATION NUMBER R131 DTS.	DEALER STAMP ARROWSTAR RACING CENTREMEAD OSNEY MEAD OXFORD OX2 0ES TEL: 01865 201 155 FAX: 01865 201177
CHASSIS NUMBER	
ACTUAL MILEAGE 7583	
DATE 24/08/98.	

INTERMEDIATE SERVICE 9000 MILES OR 9 MONTHS (15000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

MAJOR SERVICE 12000 MILES OR 12 MONTHS (20000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

INTERMEDIATE SERVICE 15000 MILES OR 15 MONTHS (25000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

FULL SERVICE 18000 MILES OR 18 MONTHS (30000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

INTERMEDIATE SERVICE 21000 MILES OR 21 MONTHS (35000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

MAJOR SERVICE 24000 MILES OR 24 MONTHS (40000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

INTERMEDIATE SERVICE 27000 MILES OR 27 MONTHS (45000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

FULL SERVICE 30000 MILES OR 30 MONTHS (500000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

INTERMEDIATE SERVICE 33000 MILES OR 33 MONTHS (55000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

MAJOR SERVICE 36000 MILES OR 36 MONTHS (600000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

INTERMEDIATE SERVICE 39000 MILES OR 39 MONTHS (65000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

FULL SERVICE 42000 MILES OR 42 MONTHS (700000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

INTERMEDIATE SERVICE 45000 MILES OR 45 MONTHS (75000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	

MAJOR SERVICE 48000 MILES OR 48 MONTHS (800000 K.M.)

REGISTRATION NUMBER	DEALER STAMP
CHASSIS NUMBER	
ACTUAL MILEAGE	
DATE	