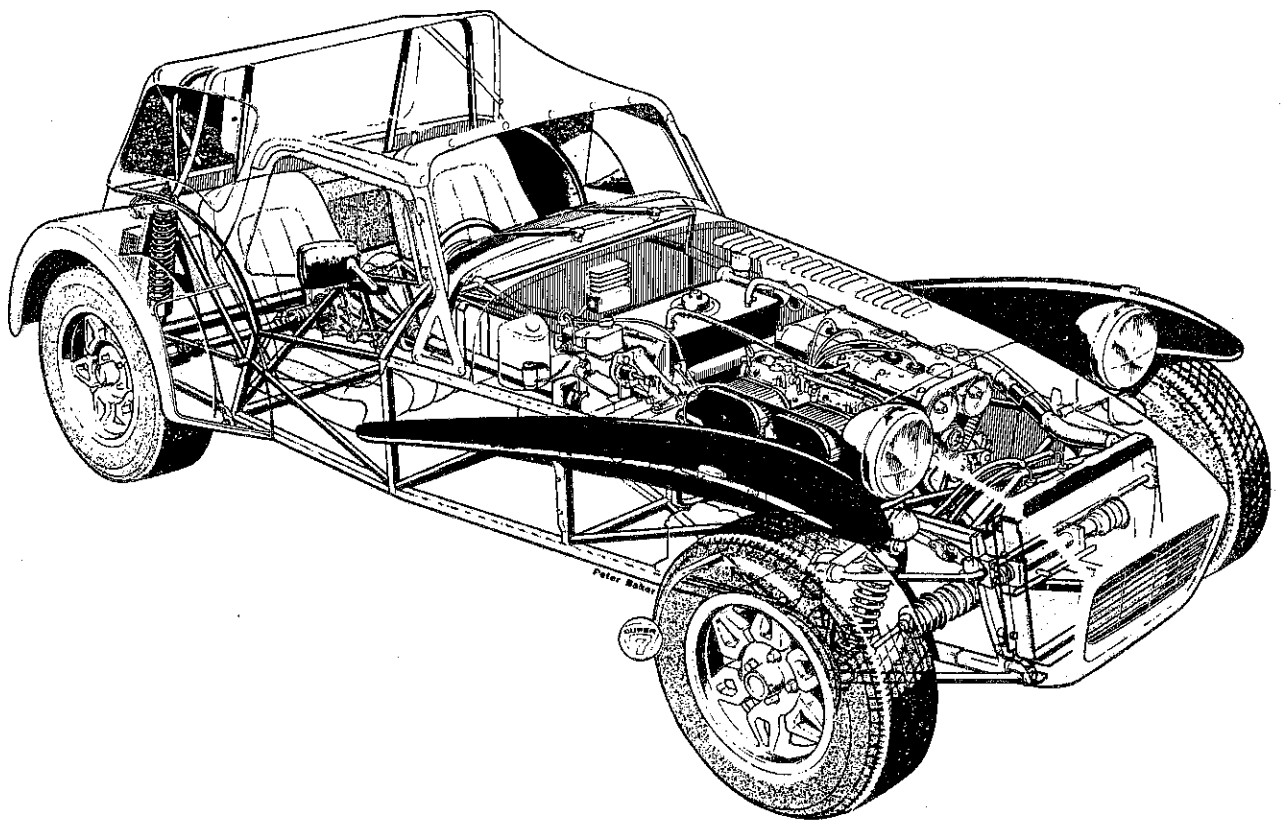




# **ASSEMBLY GUIDE**

Caterham Car Sales  
and Coachworks Ltd

CATERHAM  
SUPER SEVEN<sup>®</sup>  
1600 BDR 1986



SALES

Caterham Car Sales Ltd  
Seven House . Town End  
Caterham Hill  
Surrey CR3 5UG  
Tel: Caterham (0883) 46666/7

SERVICE & PARTS

Caterham Car Sales Ltd  
Unit 2 . Kennet Road  
Crayford . Dartford  
Kent DA1 4QN  
Tel: Dartford (0322) 59125

CATERHAM  
SUPER SEVEN

KIT ASSEMBLY MANUAL

October 1988

INDEX

1. Introduction to The Seven
2. Ordering Specification
3. Basic Assembly Hints
4. Assembly of Front Uprights
5. Assembly of Front Suspension
6. Assembly of Steering
7. Assembly of De Dion Rear Suspension
8. Assembly of Live Axle Rear Suspension
9. Miscellaneous Kit
10. Installation of Engine Gearbox and Cooling Kit
11. Attachment of Lighting Kit
12. Installation of Interior Kit
13. Attachment of Weather Equipment Kit
14. Extras
15. Registration Procedure
16. Preparation for Competition
17. Final checks and service information
18. Engine Kit Assembly
19. Index

Copyright in the contents of this manual is owned by Caterham Car Sales and Coachworks Limited and the reproduction of the contents in any form (including photocopy) in whole or in part without written authorisation from Caterham Car Sales and Coachworks Limited constitutes an infringement of copyright. Proceedings in civil and criminal law will be taken against infringers.

## 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 100E 1172cc 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 car was introduced. This had a lighter spaceframe and fitted clamshell front wings 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 of the Ford Classic 109E 1340cc engine in 1961 initially, and later the 1498cc 116E engine from the Cortina in 1962 were available. These later models were known as Super Sevens and in Cosworth tuned form made shatteringly fast road/club race cars for their day.

## INTRODUCTION

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, but although around 600 cars were built - and it was certainly successful for a

## INTRODUCTION

while - this car was dropped by Lotus in 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

## INTRODUCTION

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.

At much the same time, 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 Sierra.

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 1691cc with larger valves and a high lift camshaft to produce some 135 BHP with minimal

## INTRODUCTION

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.

The Lotus Seven has almost always been available in kit form and even largely built up (Component) cars for sale on the UK market have to be completed by the customer in order to avoid the requirements of National Type Approval.

Latterly, however, Caterham Cars have been unable to keep up with demand for semi-complete component cars and hence are once again supplying cars as full kits for 'home assembly by persons not engaged in the trade of manufacturing or assembling motor vehicles'.

This assembly guide has therefore been produced to give the non expert near comprehensive instruction as to how a car can be built to the same standard as those produced by Caterham Cars.

For more experienced builders, this guide may be somewhat elementary in its detail. However, no doubt some chapters will be helpful and we wish all our customers many hours of pleasure building a car that both they, and we at Caterham, can be proud of.



## ORDERING SPECIFICATION

### ORDERING SPECIFICATIONS

The Super Seven is sold to customers all over the world so individual specifications are likely to vary according to the legislation of the country where the car is to be registered.

This guide is aimed primarily at UK customers although differences, other than left hand drive, are likely to be minor. If there is any doubt, Caterham Cars should be consulted.

#### Chassis

Apart from left or right hand drive, the basic chassis is available in three forms; short cockpit, long cockpit and long cockpit De Dion. The De Dion car is not available in short cockpit form.

#### Engines

Caterham currently supply two engines as standard equipment; the Ford 2265E 1600cc overhead valve crossflow unit, or the Cosworth BDR 16 valve double overhead camshaft engine.

The Lotus Twin-Cam, although unavailable new, can be fitted but it should be stressed that the engine gearbox and axle combination must be specified at the time of ordering the chassis.

We strongly recommend the use of the Ford 2265E engine and in particular the later 711M block which is considerably stiffer than earlier units. These engines are used in Formula Ford 1600 racing

## ORDERING SPECIFICATION

and are not only cheap and readily obtainable new and second hand but also very robust and easily tuneable.

The majority of Caterham Super Sevens sold have been fitted with this engine and when tuned to our 'Supersprint 1700cc specification around 135 bhp at the flywheel can be obtained reliably. A tuning kit to this specification is available and further tuning is, of course, possible. We will be happy to supply advice, parts and complete engines as necessary

It should be noted that the inlet manifold used by Caterham in order to fit Weber DCOE carburettors is specially manufactured to position the air filters correctly in the bonnet aperture without offsetting them so far as to cause clearance problems to the inside face of the front wing.

Customers should note that the use of an alternative manifold may cause problems

Similarly, Caterham can supply electronic ignition systems and standard distributors (pushrod or twin-cam) compatible with the vehicle wiring loom and the inlet manifold. Whether their performance is suitable for your specification engine is a question which can only be answered by your engine builder.

One problem applying to all Sevens is ground clearance. All engines should be fitted with a 'rear panel sump as fitted to an Escort 1600

## ORDERING SPECIFICATION

or early Capri (1969 - 1972), along with appropriate pick-up pipe and dipstick. The Capri sump is ideal since it provides the best ground clearance without loss of capacity and is already sufficiently baffled for hard road or road tyre' competition use. These can however, be rather difficult to obtain being no longer available as a new Ford part.

### Gearboxes/Back Axles

It is strongly recommended that the home builder chooses a specification of car that represents an original Caterham build. This will ensure the availability of spare parts and will help the car retain its residual value.

The following combinations are therefore recommended and as each chassis is built to order it is important that the following chart is studied first.

	Short Cockpit	Long Cockpit	De Dion	
	A	B	C	D
Engine	Ford OHV Lotus TC -	Ford OHV Lotus TC -	Ford OHV Lotus TC Cosworth BDR	Ford OHV Lotus TC Cosworth BDR
Gearbox	Ford Escort Sport Mk II	Ford Escort Sport Mk II	Ford Escort Sport Mk II	Ford Sierra XR4i 5 speed
Axle	Morris Ital/ Marina	Morris Ital/ Marina	Caterham De Dion	Caterham De Dion

## ORDERING SPECIFICATION

Original Caterham Sevens manufactured between 1974 and 1980 used the 4 speed gearbox fitted to the late model Ford Corsair GT and Mk I Cortina 1500GT (Ford part number 2821E7003AE) along with the rear axle from a Mk I or Mk II Ford Escort. Due to the age of the original vehicles these components are now very hard to come by and a miscellaneous kit can no longer be sourced for this combination. The basic chassis frames are still available on special order mainly to allow the rebuilding of old/damaged cars.

### A) & B)

The optimum gearbox here is that fitted to the Ford Escort Mk II 1600 Sport and 1600 Ghia (Ford exchange part number 5004364), which combines close ratios with a cable clutch, integral bell-housing and one piece rear gear lever extension casting.

The axle from the 1700/2000 Marina or Ital is best since this incorporates the ideal 3.64 final drive ratio. This combination is the correct 1981 to 1986 standard specification and gives the best spares availability.

For information this axle is considerably lighter than the Ford item fitted to pre 1980 Sevens, as well as having a smaller differential casing allowing the greater interior space of the Long cockpit chassis.

Rear stud centres will be the same on this combination as the Triumph front hub.

## ORDERING SPECIFICATION

C) & D)

The De Dion chassis has been extensively re-designed to take either the four speed Escort Sport gearbox or the five speed gearbox from the Ford Sierra XR4i (Ford Part No.1645418), along with a special bell-housing adaptor provided by Caterham Cars. The De Dion assembly uses largely Ford parts notably the Final Drive housing and the rear hub and brake assemblies which are sourced from the Ford Sierra range, but unfortunately not from one model.

Such items as driveshafts and the De Dion tube itself, however are only available from Caterham Cars.

It should be noted that special front hubs with Ford stud centres will be needed, and these will be supplied automatically with the front upright kit if a De Dion chassis is specified.

### Rear Axles

Morris Ital or Marina axles need to be both strengthened and modified for fitment into the Super Seven.

Since the exact positioning of the necessary brackets is critical to both the performance and safety of the finished car, only axles

## ORDERING SPECIFICATION

checked and modified by Caterham Cars should be used. If the axle is supplied to our works clean and clearly labelled at least three weeks before the kit is due for collection it should normally be possible to collect both together. If you intend to use your Seven for racing this axle should be baffled (see 16.4.5).

It should be noted that Marina/Ital axles should be supplied as a complete assembly cleaned and drained.

### Wheel and Tyres

The following combinations are recommended to give the correct rolling radius and wheel/tyre ratio.

- |  |   |
|--|---|
| i) 5 <sup>1</sup> / <sub>2</sub> " x 13 wheels | 165 HR 13 Tyres (Live axle only)                              |
| ii) 6" x 13 wheels                             | 185/70 HR 13 Tyres  |
| iii) 6" x 14 wheels                            | 185/65 HR 14 Tyres or<br>185/60 HR 14 Tyres<br>(De-Dion only) |

All wheels should have 19mm inset or negative offset. Stud centres as follows:

Combination C or D	4 stud 4.25 inch PCD (108 mm) 7/16 UNF thread (early) or 12mm x 1.5 thread (late) according to age.
--------------------	---

Combination A or B	4 stud 3.75 inch PCD (95 mm) 3/8 UNF thread
--------------------	---

## ORDERING SPECIFICATION

It must be stressed that the car has been designed around these wheel/tyre combinations and that under or oversize combinations will almost certainly cause problems with steering, handling, ride, gearing and speedometer calibration, body and ground clearance.

For competition purposes, 185/60 x 13 tyres will aid roadholding and lower overall gearing, but will cause ground clearance problems and cannot therefore be recommended for road use.

### Speedometer Calibration

When ordering your kit, it is important to specify which gearbox/axle combination you are using along with the final drive ratio and wheel tyre size. If you do not, your speedometer may well be inaccurate which, apart from the consequences of being stopped for speeding, is illegal in the UK and EEC countries.

All live axle kits are supplied with the same speedometer labelled on the case  $W = 1.00$  ( $W = 0.625$  for k.p.h). Correct calibration is achieved by changing the plastic driven gear in the gearbox. Speedometer recommendations for the Escort Sport/ Marina or Ital cars are shown below.

Diff Ratio	No of Teeth on Driven Gear	Ford Finis Code for Driven Gear
3.64	22	1546878
3.89	24	6011062
4.11	25	1546789

## ORDERING SPECIFICATION

Five speed De Dion cars are fitted with differently calibrated speedometers depending on the differential ratio used. This is due to the fact that correct calibration cannot be achieved by a change of driven gear in the gearbox (in particular no gear is available from Ford to suit a 3.92 differential) therefore your gearbox should always be fitted with a 24 tooth gear Finis Code 6011058.

Speedometer Calibration	Diff Ratio
W = 1.00 (0.625 k.p.h.)	3.62
w = 1.10 (0.688 k.p.h.)	3.92 (standard)

All kits leave the factory with 3.92 calibration speedometers. If a 3.62 ratio Diff is fitted, please arrange to exchange the unit with factory PRIOR to clocking miles on it.

### Ordering of supplementary kits and accessories

There have been a number of minor changes to the specification of the Seven recently and more are anticipated as we continually seek to keep up with changing legislation and make engineering improvements. It is important therefore that you always quote the chassis number of your car to us when ordering, especially when it is being built over an extended period, or we may unintentionally provide you with components incompatible with your basic kit.

### Caterham Cars Relocation

In October 1987, Caterham Cars opened their new factory at Crayford in Kent. This means that the company is split into two locations



## ORDERING SPECIFICATION

with sales remaining at the Company's traditional site at Caterham and production expanded into this additional 23 500 sq ft facility.

Please note therefore that although you should place your order at Caterham, your car and any subsequent parts should be collected from Crayford. However any queries relating to specification or availability must be addressed to our Caterham office, whilst technical queries during the build of your kit should be directed to Crayford.

Please call any of the following personnel on (0322) 59124/5/6:

Andy Noble

Peter Cooper

Mike Dixon

Jez Coates

### Subsidiary Kit Listings

The remaining pages of this section contain a list of the subsidiary kits available to complete your car and their contents at the time of publishing this manual. Exact contents may change as minor improvements are continually made to the Seven's specification

Should you choose to incorporate parts sourced elsewhere than from us we strongly advise that second hand components are not included in the braking system.

**IN PARTICULAR NEVER RE USE METAL BRAKE PIPES OR FLEXIBLE HOSES AS YOU MAY SEVERELY COMPROMISE THE SAFETY OF YOUR CAR**

## FRONT UPRIGHT KIT

1 pair	Vertical links	
2	Stub axles, nuts + 'D' washers + pin	
2	Steering arms + bolts	
2	Hubs (Triumph or Ford centres)	
2	Brake calipers	
4	Brake pads:	Material
	Live axle	2430/3401
	De Dion Drum brakes	2455/3401
	De Dion Disc brakes	3441
	(3401 and 3441 are asbestos free )	
2	Brake discs	
1 pair	Trunnions	
2 sets	Wheel bearings	
2	Grease caps	
2 sets	Brake dust shields	
2	Grease nipples	
2	1/2" nyloc nuts	
4	7/16" x 1 <sup>1</sup> / <sub>4</sub> " bolts + spring washers (caliper to upright)	
8	3/8" x 1" bolts (hub to disc)	

## FRONT SUSPENSION KIT

1 pair Wishbones  
1 pair Top links  
1 Anti-roll bar  
4 Anti-roll bar mountings  
4 5/16" x 2<sup>3</sup>/<sub>4</sub>" bolts, nylocs and washers  
2 Grease nipples  
2 Road springs  
2 Shock absorbers (fixed or adjustable seat)  
8 Y9 bushes  
4 636 bushes (2 fitted to top links, 2 to wishbones)  
2 1/2" nylocs and washers (anti-roll bar)  
2 7/16" x 2<sup>1</sup>/<sub>2</sub>" bolts and nylocs  
2 5/16" x 1" bolts and washers  
2 1/2" x 4" bolts, nylocs and washers  
2 1/2" x 2<sup>1</sup>/<sub>2</sub>" bolts, nylocs and washers  
2 1/2" x 3<sup>1</sup>/<sub>2</sub>" bolts, nylocs and washers

## STEERING KIT

- 1 Rack and pinion assembly
- 2 Rack mountings
- 1 Steering column (upper and lower)
- 1 Universal joint
- 2 Track rod ends
- 2 Column bushes
- 4 1/4" x 2<sup>3</sup>/<sub>4</sub>" bolts, nylocs and washers
- 2 1/2" plain nuts
- 1 1/2" thin nyloc nut and washer
- 2 5/16" x 1<sup>3</sup>/<sub>8</sub>" bolts and nylocs

## DE DION AXLE KIT

1	De Dion tube
2	De Dion end plates (ears)
1	Differential assembly
1 pair	Driveshafts including CV joints
2	Rear hubs
2 sets	Wheel bearings
2	Drive flanges
1	LH driveshaft nut and washer
1	RH driveshaft nut and washer
4	Blue bolts differential to propshaft
1	Breather pipe
1	Filler plug
1 pair	Brake backplates (or brake calipers)
2	Brake drums (or brake discs)
8	3/8" x 5/8" crown head bolts (discs only)
4	Brake shoes (or brake pads)
1	Handbrake cable (pulley to brake)
1 pair	Brake pipes with T piece, spacer, washer and hose
1	1/2" x 11" bolt and nyloc, 4 x 1/2" large washers
4	10mm x 40mm bolts and spring washers
4	10mm x 55mm bolts and nylocs (8 off disc brakes)
4	10mm x 65mm bolts and nylocs
20	10mm heavy duty plain washers
2	12mm x 65mm 1/2" shank bolts (diff)
10	1/2" x 7/8" thin spacer washers

## REAR SUSPENSION KIT

- 2 Radius arms
- 1 'A' frame
- 2 Road springs
- 2 Shock absorbers (fixed or adjustable seat)
- 2 Y9 bushes 'A' frame
- 2 636 bushes 'A' frame (fitted)
- 2 636 bushes large radius arm and bush (fitted)
- 2 2030 bushes small radius arm and bush (fitted)
- 1 2<sup>1</sup>/<sub>2</sub>" x 1/2" bolt + nyloc
- 2 4" x 1/2" bolts, nylocs and washers
- 2 4<sup>1</sup>/<sub>2</sub>" x 1/2" bolts, nylocs and washers
- 2 3<sup>1</sup>/<sub>2</sub>" x 3/8" bolts, nylocs and washers
- 1 Rear anti-roll bar assembly (if specified De Dion only)
  - Comprising: 1 Rear anti-roll bar
  - 2 Anti-roll bar mountings
  - 2 Grease nipples
  - 4 5/16" x 1<sup>3</sup>/<sub>4</sub>" bolts, nuts, washers
  - 2 Drop links
  - 2 Rod ends (L/H thread)
  - 2 Rod ends (R/H thread)

## MISCELLANEOUS KIT

2	Axle brake pipes (live axle only)
1	Handbrake rod + 2 clevis pins & clips (live axle only)
1	Axle breather (live axle only)
1	Handbrake strap, plate, bolts and nylocs (live axle)
2	Engine mounting rubbers, bolts and nylocs
2	Engine mounting brackets, bolts and split washers
1	Gearbox mounting, bolts and nylocs
1	Gearshift assembly & reverse stop (4 speed only)
1	Gearlever, extension and caphead bolts (5 speed only)
1	Gearlever knob, gaiter and self tapping fixings
1	Propshaft (bolts and nylocs live axle only)
1	Handbrake lever, barrel, bolts and nylocs
1	Handbrake cable and clevis (live axle only)
1	Handbrake cable, clevis, pulley & pin (lever to pulley De Dion only)
1	Throttle cable and barrel
1	Clutch cable, bolt and nyloc
1	Speedometer cable
1	Right angle drive unit, drive pin & circlip (5 speed)
1	Brake Hose Kit
1	Fuel filler neck, hose, grommet and jubilee clips
1	Screenwasher kit
1	Oil pressure sender
1	Water temperature sender
1	Battery, battery clamp and bolt
1	Coil, coil backplate and bolts

1	Steering wheel (Motolita if specified)
1	Set of horns (air horns if specified)
1	Spare wheel bolt and washer
1	Set of badges
1	Interior mirror
1	Radiator grille and clips
1	Tool bag and tools (jack, handle and wheel brace)
1	Scuttle edge trim
1	Gearbox mounting crossmember (4 speed De Dion only)
1	Gearlever mounting turret (4 speed De Dion only)
2	Gearlever stiffening plates (4 speed De Dion only)
12	Rivets for the above
1	4 speed transmission tunnel top and gearlever gaiter retaining ring (4 speed De Dion only)



## 5 SPEED GEARBOX KIT

- 1 Gearbox
- 1 Bellhousing
- 1 Spacer gearbox to bellhousing
- 1 Spacer gasket
- 4 12mm x 60mm special fine thread bolts
- 1 Speedometer gear (24 tooth), seal and cap
- 1 Clutch actuating arm
- 1 Clutch arm pivot and nylon bush
- 1 Clutch release bearing
- 1 Clutch cable bush
- 1 Clutch cable/arm rubber gaiter and clip
- 1 Reversing light switch

## COOLING KIT

1	Radiator
4	Rubber bobbins, 5/16" nuts and lockwashers
1	Expansion bottle and cap
1	Thermostat housing
1	Thermostat
1	Electric fan switch
1	Overflow pipe and clip
1	Fan motor complete with blade
1	Radiator cap
1 set	Radiator hoses

## EXHAUST KIT

1 set	Primary pipes (2 pieces standard system, 4 BDR)
1	Collector (2 inlets standard system, 4 BDR)
1	Silencer
1	Tailpipe (standard system only)
1	Exhaust guard and jubilee clips (2)
1	Silencer mounting bracket
1	Silencer mounting bobbin
1	Tailpipe mounting strap (standard system only)
1 set	Exhaust clamps (4 off standard system, 1 BDR)

## LIGHTING KIT

- 2 Headlamp bowls
- 2 Headlamps
- 2 Headlamp wiring looms
- 2 Front indicator lamps
- 2 Front indicator brackets
- 2 Front indicator wing repeaters (not cycle wing kits)
- 2 Rear lamp units
- 2 High intensity rear foglamps
- 2 Reversing lamps
- 1 Rear number plate lamp
- Various fixings

## INTERIOR TRIM KIT

1 pair	Footwell carpets
1	Transmission tunnel carpet
1	Boot floor
1	Boot carpet
1 set	Seats (fixed or adjustable as specified)
1	Bulkhead carpet (adjustable seats only)
2	Underseat carpets (adjustable seats only)
1 set	Fasteners
1	Fastener rivetting tool

#### WEATHER EQUIPMENT KIT

1	Hood
1 pair	Hoodsticks
1 pair	Hoodstraps
1 pair	Sidescreens
4	Sidescreen hinges
2	Sidescreen hinge pins
2	Turnbutton sets
2	5mm x 25mm posidrive screws, nylocs and washers
2	5mm x 40mm posidrive screws, nylocs and washers
16	5mm x 16mm posidrive screws, nylocs and washers
1 set	Fasteners
1	Fastener rivetting tool

## **BASIC ASSEMBLY**

The kits as supplied by Caterham Cars will assemble without special jigs and tools and are very much designed around the amateur car builder with basic facilities.

We suggest that when you get the kit home, the chassis be supported on 4 axle stands which will give both stability for safe working and ready access. Ideally these should be positioned at each end of the second chassis crosstube adjacent to the rear wishbone mounting, at the front (see Fig.3), and at each end of the chassis crosstube supporting the front of the fuel tank at the rear.

A work bench for sub assembly jobs would be helpful along with a good vice for both holding items stable and lightly pressing parts into position.

Although brute force will never be necessary if assembly is carried out in the right sequence, a soft copper/hide or plastic/rubber hammer will be useful to aid striking items into place without causing damage.

Each Caterham Super 7 kit is supplied with a computer print out, providing a breakdown of the basic starter kit, subsidiary kits and options supplied.

The first page of this shows your name, your kit number and your

## BASIC ASSEMBLY

order number. Please make a note of your order number as this is the reference by which we know you and your kit. and will ensure that, no matter how long you take to assemble your car, subsequent packages will be compatible.

On the lower half of the first page and on page 2 is a list of sequence numbers. 01 to 06 give a breakdown of the basic kit, i.e. Chassis Body Unit (CBU), brakes and pedals, instruments switches and wiring loom, windscreen and wipers, fibreglass and fuel tank.

Sequence numbers 07 onwards give a list of packages you have selected to be supplied with your kit, e.g. front suspension, rear suspension cooling, etc

After the listing of your selected packages and options, each package is broken down into part (product) numbers and quantity required. It should be noted that in most of these packages the final item is a hardware or Z pack. Each Z pack is given its own breakdown listed after the final option listing.

It is important to note that these hardware packs are listed in alpha numeric order, for example hardware pack ZBC02 will come before ZRB01 even though the boot cover is listed after the roll over bar in the options list.

The hardware packs consist mainly of nuts and bolts with other sundry fasteners such as ty-wraps and jubilee clips. A simple part numbering system is used to identify nuts, bolts, setscrews and



## BASIC ASSEMBLY

washers:

**BOLTS:** (shank only partly threaded)

Designated initially with a B followed by thread type, shank diameter and length.

Thread types are quoted as:

F = UNF
C = UNC
M = Metric

Diameter and length sizes are given in inches for UNF and UNC and in mm for metric e.g. BF 7/16 x 2<sup>3</sup>/<sub>4</sub> is a UNF threaded bolt of 7/16" diameter and length 2<sup>3</sup>/<sub>4</sub>"

**SETSCREWS:** (shank wholly threaded)

Designated initially with an s followed by thread type, diameter and length e.g. SM 10 x 30 is a setscrew of metric thread, 10mm diameter and 30mm length.

**NUTS:**

Designated initially with an N, followed by thread type, nut type and length. Nut type is either:

Nyloc	Y
Plain	P
Brass	B

Length is quoted as either full F or half H

e.g. NFYH 5/16 is a UNF Nyloc, 5/16" diameter half nut.

**WASHERS:**

Designated initially with a W followed by the type (Spring S or Plain P), the duty (most Caterham washers are heavy duty H) and finally M for optional metric.

e.g. WSH 1/4" is a 1/4" diameter heavy duty spring washer

## BASIC ASSEMBLY

Please note that the kit does contain some special fasteners unique to Caterham Cars, these are designated with their own individual product numbers.

The following points are helpful tips to bear in mind when assembling your kit:

1. Always test fit items to ensure that you understand their correct location and that they do fit. It may occasionally be necessary to ease mounting holes for certain bolts. IF YOU HAVE ANY DOUBTS - RING US.
2. Always assume that bolts and fasteners are not properly tightened until they have been specifically checked.
3. Check all fluid levels before operation, rear axles and 5-Speed gearboxes are particularly easy to overlook.
4. Apply the correct tightening torques. Where not specified, please use the following table as a guide. Over-tightening can often cause more problems than under-tightening, such as sheared bolts and studs, and incorrect stresses.

Thread Size	Spanner Size A/F	Torque (lb/ft)
1/4 UNF or UNC	7/16	5-7
5/16 UNF or UNC	1/2	12-15
3/8 UNF or UNC	9/16	20-25
7/16 UNF	5/8 or 11/16	40-45
1/2 UNF	3/4	50-60

## BASIC ASSEMBLY

All safety critical fastenings supplied by Caterham Cars are high tensile conforming to British Standards 1768 (Imperial) and 3692 (Metric). Customers supplying their own should only use high tensile fasteners marked either "8.8" or "12.9" on the head, particularly when attaching suspension, steering, upright and axle kits. Any unmarked bolts should not be used.

The car is assembled with predominantly Imperial nuts and bolts but in some areas Metric items are used.

The following should provide a helpful guide :-

Suspension & Steering	UNF
Engine	UNC
Gearbox (Escort Sport & 5-Speed)	Metric
Live Axle	UNF
De-Dion Axle	Metric

5. In order to ensure ease of assembly and subsequent maintenance, we suggest the use of the following:
  - a) Castrol LM grease (or equivalent) for general use wherever movement occurs.
  - b) 'Rubber Lube' to ease assembly and operation of rubber bushes and grommets.
  - c) 'Copper Slip' anti-sieze compound where lubrication is not needed to ensure easy future disassembly.
  - d) 'Loctite' thread locking fluid where the application prevents the use of nylon locking (Nyloc) nuts or spring washers.

## BASIC ASSEMBLY

Please note that all sealants should be applied very sparingly and the thinnest possible layer achieved, any excess should be wiped away immediately once the components are assembled.

6. The kits provided by Caterham (from the factory at Crayford) include all the items needed to build the car but, due to the sheer number of different components, it is sometimes possible that parts are omitted or duplicated. We therefore strongly recommend that you check that all items listed on your computer print out are correctly provided on receipt of your kit. If you live some distance away from Crayford, we suggest that this check be carried out on our premises to avoid disappointment and delay on your return home.
7. Due to the nature of the motor industry, it is frequently necessary for us to change suppliers and/or make minor changes to the car's specification. This will generally be explained to you on collection, but if you come across something which differs from these instructions, please do not hesitate to contact us.
8. The golden rule must be 'WHEN IN DOUBT, ASK'. Caterham Cars happily provide technical back up when required.
9. Basic starter kits as supplied by Caterham are unpainted, the bodywork being bare aluminium and the wings and nosecone pre-impregnated fibreglass.

## BASIC ASSEMBLY

If you wish your car to be painted, we advise that the following be either removed or fitment delayed until painting is complete.

- i) front and rear wings, nosecone
- ii) front wing stays
- iii) bonnet catches from both bonnet and chassis
- iv) windscreen
- v) windscreen wiper spindle rubbers

Considerable masking is necessary before a Seven can be sprayed so, if you are proposing to get a local bodyshop to do the job, significant cost savings can be made if you do this yourself.

If you intend that the headlamp bowls should match the rest of the car, ensure that the lighting kit is ordered for collection at the same time as your starter kit.

You will notice that the rear of the car is marked in order that the holes for the popper bases which secure the hood are correctly located. These should be drilled with a 5/32" drill before painting.

You should note that cars are normally supplied with wings unfitted so a small amount of additional work is necessary to attach them. (refer section 9.5.6) From mid 1988 the rear front wing stays will be deleted and the wing mountings in the chassis strengthened to compensate.

10. Due to the composition of the subsidiary kits and their necessity to link together, it is important to study the whole manual before commencing assembly.

## BASIC ASSEMBLY

It is structured in a manner that presents a logical build sequence but the car does not have to be assembled in this precise order.

In particular the propshaft is supplied in the miscellaneous kit. With De Dion cars it is not possible to install the propshaft once the differential unit has been fitted and therefore we recommend that the rear axle, rear suspension and miscellaneous kits are purchased together.

The miscellaneous kit in either variety of car contains items relating to the rear axle, engine, gearbox, braking and interior which are covered in sections prior to that dealing specifically with this kit.

11. Seven Builders should take care to observe basic safety precautions whilst assembling their kits since tools parts and materials incorrectly handled can cause injury.

In particular your attention should be brought to the following:

- i) do not work underneath a car that is not properly supported, a jack alone is not sufficient
- ii) avoid prolonged and repeated contact with oils, particularly used mineral oils, which will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis and the ultimate possibility of skin cancer.
- iii) First Aid treatment should be obtained immediately for open

## BASIC ASSEMBLY

cuts and wounds

iv) we advise the use of barrier creams, applied before starting potentially oily jobs, to help the removal of oil from the skin. Wash with soap and water to ensure all oil is removed (skin cleansers and nail brushes will help) and do not use petrol, diesel fuel, thinners or solvents for washing skin.

v) where there is risk of particles getting into your eyes, for example when working underneath your car or while drilling or filing some form of eye protection is recommended.

FRONT JACKING POINTS

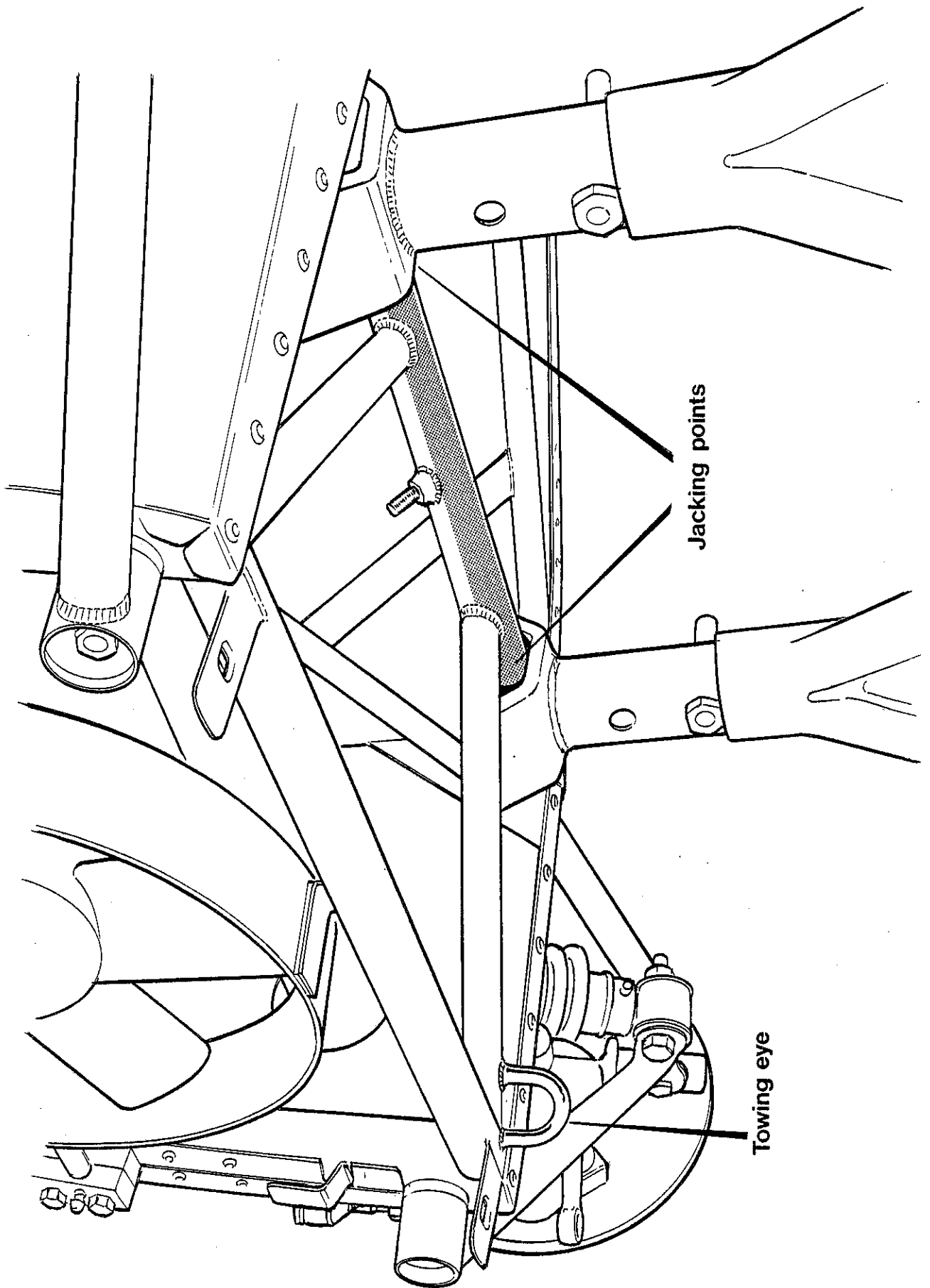


Fig. 3



## ASSEMBLY OF FRONT UPRIGHTS

4.1 The front upright is common to the MK IV Triumph Spitfire with the exception of the brake pads, but we strongly advise that new items are used as both the braking and suspension systems are safety critical.

4.2 The first step is the assembly of the two front trunnions which are handed left and right under part numbers QSK 90 LH and QSK 90 RH. Refer to diagram 4.1.1 for clarity. Assembly is identical for each side as follows:

2.1 Lightly grease one of the smaller steel washers and place over the top hat bush, lip facing outwards and press into the trunnion using a vice. Repeat with the second top hat bush into the other side.

2.2 Push the stainless steel bush duly greased through the hole in the top hat bushes, again using a vice. (use the stainless steel bushes provided by Caterham's not the inferior mild steel items in the Quinton Hazell kit)

2.3 Slip a rubber sealing washer over the outside of the top hat bush and clip the larger steel washer, again well greased, around the outside of this so as to leave the bush and rubber seal enclosed and hence dirt proof.

## ASSEMBLY OF FRONT UPRIGHTS

2.4 Hold this assembly together temporarily either with the 7/16" bolt provided or a tywrap until later assembly onto the front wishbone.

2.5 Repeat this exercise for the other side. Note that the trunnion kits include a rubber bush with a steel insert. These are not needed.

4.3. The front uprights themselves should next be assembled. These are handed and clearly marked LH and RH.

3.1 Press a dust shield onto the outer side of the upright using a vice. This is a tight fit and care should be taken to get this on both fully and evenly.

3.2 The appropriate trunnion should be half filled with Hypoid 90 oil and then screwed onto the bottom of the upright with the rubber dust cover sandwiched above the trunnion. Please note that the left hand trunnion has a left hand thread.

The trunnion should be wound up by hand to the limit of its travel and then unwound until it can rotate freely. This should only be by about one turn and if at first it seems too stiff, repeated screwing and unscrewing will loosen it.

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.

## ASSEMBLY OF FRONT UPRIGHTS

3.3 While this is happening, oil will ooze out around the seal and also the hole for the grease nipple.

When assembled, insert the grease nipple and tighten lightly using a 3/32" AF spanner. Fill the trunion with more oil until it oozes around the seal once again.

### 4.4. Stub axle and steering arm assembly.

4.1 Degrease one of the stub axles, which are not handed, using petrol or thinners and insert into upright as shown in figure 4.4.1.

4.2 Select the appropriate steering arm (XAW 3769 LH) or (XAW 3667 RH), disc back plate (these are handed) and assemble onto upright according to the diagram using a 1/2" nyloc nut (3/4 AF spanner) on the end of the stub axle and a 7/16" x 1<sup>7</sup>/<sub>8</sub>" bolt and lock washer to attach the steering arm and back plate.

Note that the steering arm faces forwards, horizontally and that the disc back plate ends up on the outside of the upright with its locating tags on the inside.

Use a little copperslip on the bolt locating the steering arm and temporarily insert the two 7/16" x 1<sup>1</sup>/<sub>4</sub>" bolts to ensure the correct location of the backplate before tightening the stub axle locating nut and the steering arm bolt.

## ASSEMBLY OF FRONT UPRIGHTS

Torque settings:	Stub axle	60-65 lb ft.
	Steering arm to upright	22-27 lb ft.

4.3 Should cycle wings have been opted for, the stays which locate onto the front upright should be fitted at this stage using a thin 1/2" UNF nyloc fitted to the stub axle in place of the standard thickness nyloc.

### 4.5. Front Hub Assembly.

5.1 Insert wheel studs into hub casting as illustrated in figure 4.4.1. These can either be lightly tapped into position with a small hammer or pulled into position using a wheel nut and a suitable plain washer to avoid damaging the hub face. On later kits, these may already have been fitted.

5.2 Fit both the inner and outer taper roller bearing housings into the hub casting. Referring to figure 4.5.2., note that the larger bearing fits into the inner housing and both need to be pushed fully home into the hub. This can be done either using a vice or by tapping into place with a hammer and a suitable drift, taking very great care not to damage either the hub or the bearing face.

5.3 Pack the inner bearing race liberally with grease, along with its housing, and place into position.

The dust cover should now be pressed into place retaining this

## ASSEMBLY OF FRONT UPRIGHTS

bearing. Note that the metal side should face the bearing and the felt outer acts as a dust seal against the upright when fitted.

This is a tight fit and may prove very difficult to achieve with a bench vice and hammer only. Ideally it should be fitted using a press and if your local garage cannot help you, Caterham Cars will happily fit this for you on appointment.

5.4 The brake discs should now be relieved of their protective coating, methylated spirit is ideal for this job, and fitted to the hubs using four 3/8" x 1<sup>1</sup>/<sub>2</sub>" bolts as shown on the diagram.

These bolts should be torqued to 22-27 lb ft.

### 4.6. Final Assembly

6.1 The hub/disc assembly can now be fitted onto the stub axle. Push the assembly firmly home and ensure that the outer bearing race is pushed into place in its housing. The large washer with the half-moon centre should be fitted over the hub spindle to locate and protect the bearing and the 1/2" castellated nut screwed into place.

Because this is a taper roller assembly, the nut should be done up until all trace of free play in the bearings is eliminated, but not so tightly that the free spinning of the hub is restricted.

## ASSEMBLY OF FRONT UPRIGHTS

The split pin should be fitted through the hole in the hub spindle which should line up with one of the slots in the castellated nut. If it does not, slacken the nut slightly. Finally, clip the dust cap into place.

6.2 The brake caliper assembly can now be fitted to the upright, and it should be noted that these are handed. In either case the bleed nipple and flexible pipe input should be uppermost. Note that the dust shield should be fitted into place first since the same  $7/16"$  x  $1\frac{3}{4}"$  bolts locate both. These bolts should be torqued up to 40-45 lb ft.

6.3 The brake pads can now be fitted into the calipers. These are retained by the two pins which, when the retaining clips are removed, can be slid out in order that the pad can be positioned.

Check that your pads are correct for the specification of car that you are building. (see component listing)

Use a little copperslip on the edges and back of the pads to prevent seizure and assemble into the caliper. Note that the anti-squeal shims fit between the pad and the caliper piston and ensure that the little arrows stamped on them reflect the normal (forward) direction of travel.

The retaining pins should be slid into place (it does not particularly matter whether from the inside or outside of the

## ASSEMBLY OF FRONT UPRIGHTS

caliper) capturing both shims and pads, and are locked using the spring clips.

6.4 This procedure should be repeated for the other side and both assemblies put on one side until the front suspension is ready.

**Front Trunnion**

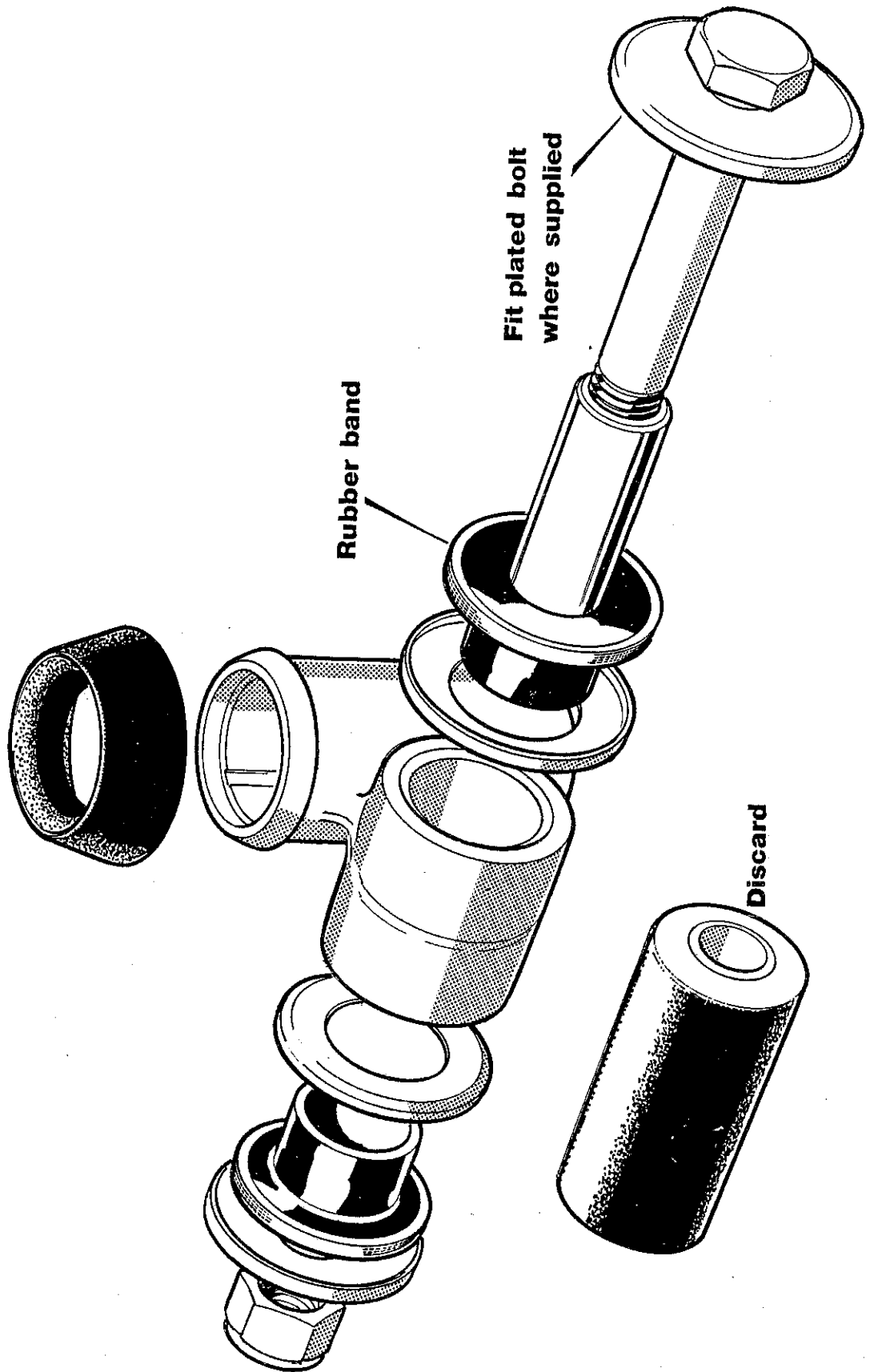


Fig. 4.1.1



## Front Upright Assembly

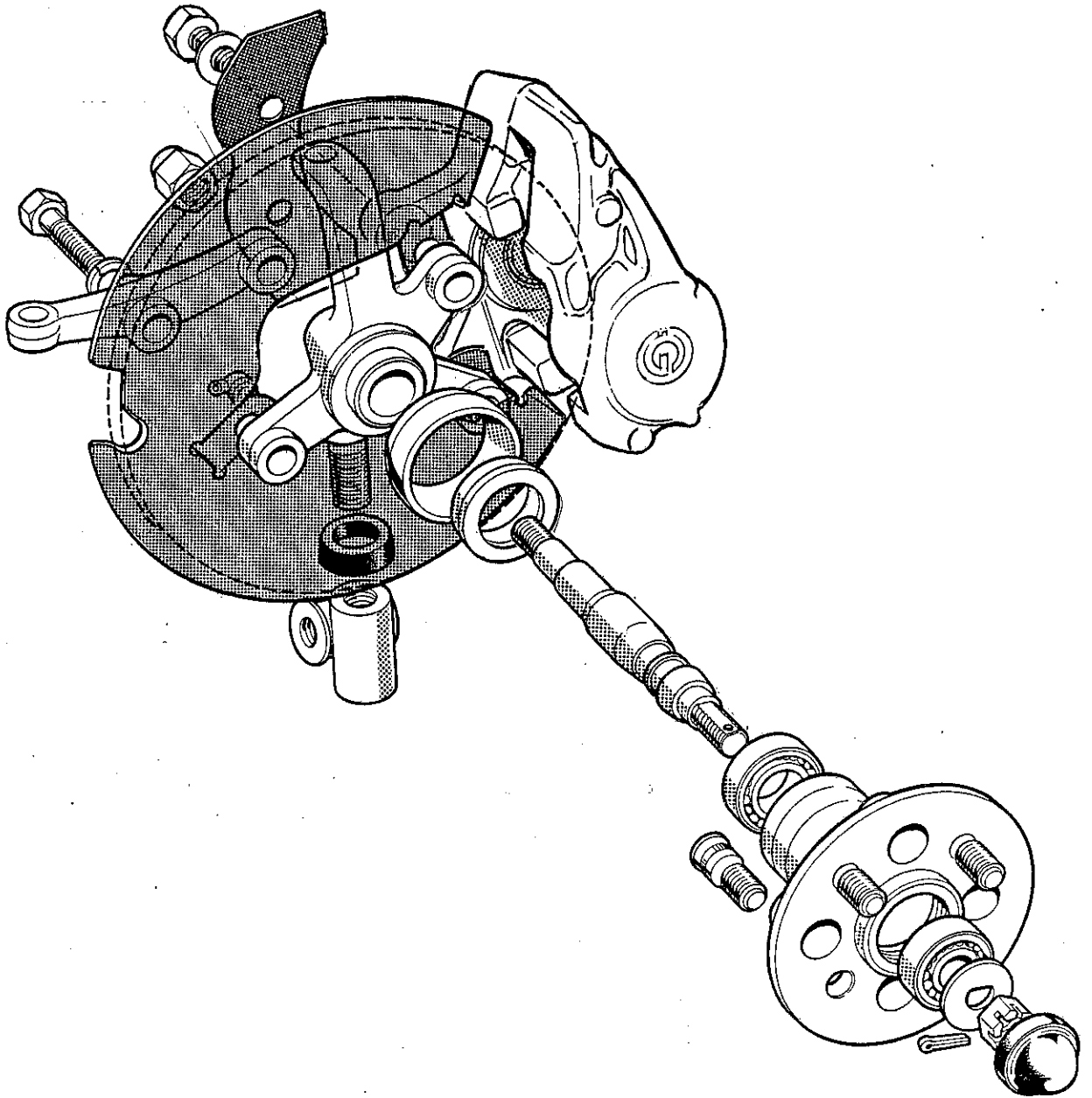


Fig. 4.4.1

**Front Hub**

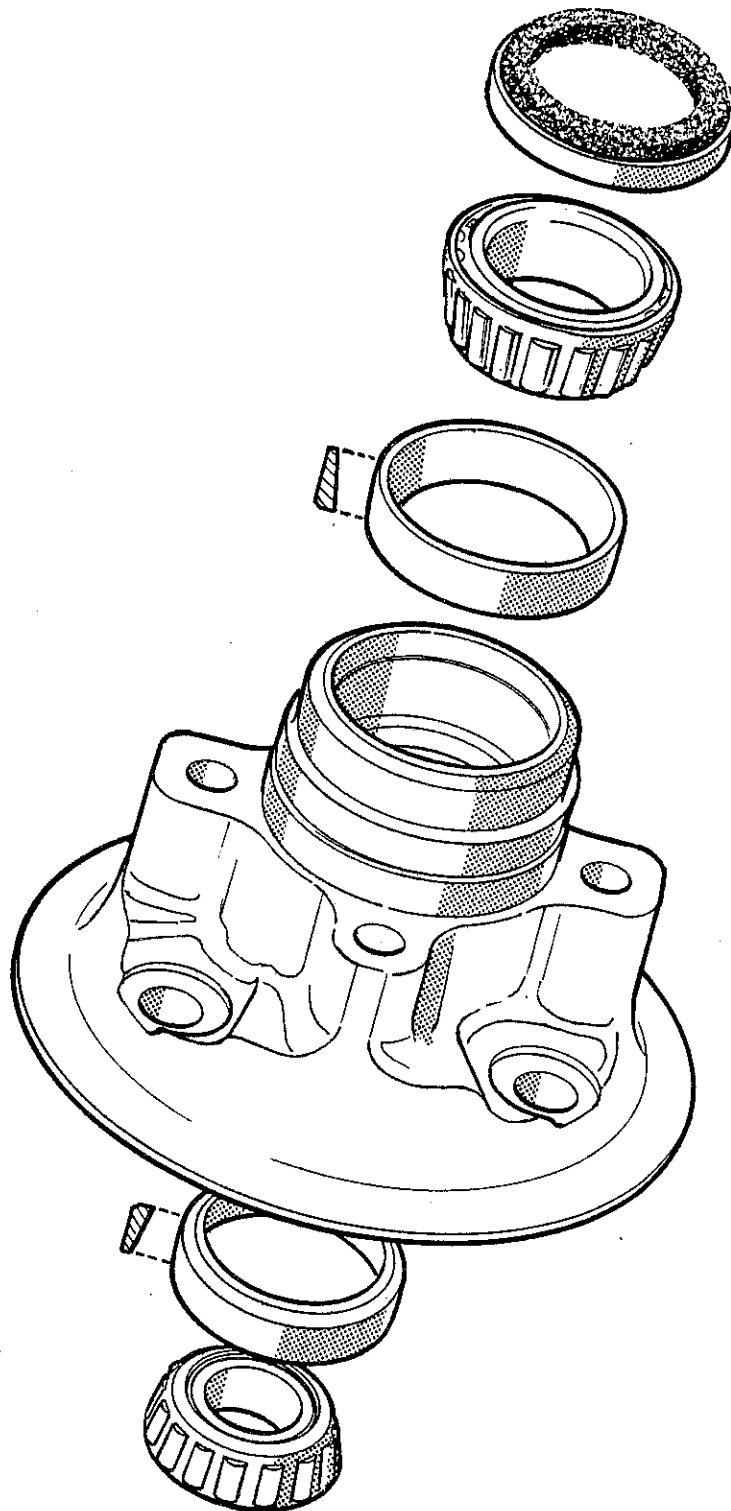


Fig. 4.5.2

## FRONT SUSPENSION

5.1. Please note that figures 5A and 5B are provided at the end of this section which show the general layout of the completed assembly. However before starting a small amount of preparation will be necessary.

1.1 If the front clamshell wings are removed, a simple task, access to the front suspension is considerably improved and indeed we suggest these are left off until after the engine is installed, both to ease access and to prevent any damage.

1.2 The two top suspension links are supplied unpainted and to avoid corrosion these will need to be degreased before painting with 'Hammerite' or something similar.

1.3 At the lower front of the chassis are found the spindles for locating the front wishbones. The stove enamelling should be removed from these and a light coating of grease will help with later maintenance.

1.4 The anti-roll bar is held onto the chassis with aluminium mounting blocks. The paint should be removed from the bar at the points where it passes through these so as to ensure free movement. In addition it is wise to trial fit the bar in its mounting blocks prior to fitment of any other suspension components to check that there is no binding when the fixing bolts are tight.

## FRONT SUSPENSION

1.5 When assembling the front suspension, there is a risk that the aluminium body skin can be damaged, especially when fitting the top mounting bolt. It is therefore advisable, particularly with painted cars, to protect the bodywork with masking tape in key areas.

### 5.2. Front Suspension Assembly - Upper

2.1 Press a 636 (steel/rubber/steel) bush into each top suspension link. These are an interference fit and the use of a press will be necessary, as a bench vice is not strong enough.

This unfortunately means that you will need to chat up your local garage who should have a suitable press.

2.2 Using a 1/2" x 4" bolt, washer and nyloc, assemble the coil spring damper unit and the top suspension link onto the upper mounting bracket on the chassis, noting that the damper rate adjusting screw is both at the bottom and faces inward towards the centre line of the car. The bolt head should face forwards with the plain washer between it and the damper and great care should be taken not to damage the body skin.

Note that unlike the spring damper assemblies, the top links are handed and when fitted should be angled forwards with the knuckle joint facing downwards. Do NOT tighten at this stage.

2.3 The anti-roll bar should be fitted next. Push two half

## FRONT SUSPENSION

bushes onto the threaded ends of the roll bar smearing well with rubberlube. The ends of the anti-roll bar locate through the holes provided in the top links and are held in place using the other halves of the bushes, 1/2" plain washers and 1/2" UNF nylon nuts which should not be tightened yet.

2.4 Assemble the aluminium blocks onto the front of the chassis (noting that these are machined as two pairs) capturing the anti-roll bar and bolt into place using the four 5/16" x 2<sup>3</sup>/<sub>4</sub>" x bolts with the blocks drilled to take a grease nipple outwards. Insert the grease nipples, lightly tightening with a 9/32" AF spanner, and once the main locating bolts are tightened, fill with grease using a grease gun.

### 5.3. Front Suspension Assembly - Lower

3.1 Fit a lightly rubberlubed half bush over each of the lower wishbone mounting spindles at the front of the chassis, stripped of stove enamelling (as in 1.3).

3.2 The front lower wishbones are handed and you should note that the damper location should end up lower than the front upright as shown in the diagram.

3.3 Select the appropriate wishbone and position its open end over the spindle and bush and using gentle pressure backwards, ease its other end, with the bush already fitted, through the corresponding slot in the body skin and line up with the lower

## FRONT SUSPENSION

rear mounting point.

Great care must be taken to avoid damage to the bodywork at this point and protection with masking tape is advised.

Secure the rear lower wishbone mounting with 1/2" x 3<sup>1</sup>/<sub>2</sub>" bolt washer and nyloc, inserting the bolt from the rear with the washer against its head. Do NOT fully tighten at this stage.

3.4 Insert the other rubberlubed half bush into the forward end of the wishbone over the spindle and secure using a 5/16" x 1" bolt, springwasher and 5/16" x 1<sup>1</sup>/<sub>4</sub>" diameter plain washer. The spindles are threaded for this purpose, although care should be taken to ensure that excess stove enamelling does not cause cross threading and we suggest that the bolts are tested in these holes prior to actual assembly. Do NOT fully tighten at this stage.

### 5.4. Final Assembly

4.1 The coil spring damper units should now be attached to the lower wishbones securing with the 1/2" x 2<sup>1</sup>/<sub>2</sub>" bolts and 1/2" AF nyloc nuts, noting that the bolt head faces forwards so as any exposed thread is to the rear of the wishbone and thus relatively safe from dirt. Do not fully tighten at this stage.

4.2 Locate the front upright assemblies onto the lower wishbones securing through the trunnions with the 7/16" x 2<sup>3</sup>/<sub>4</sub>"

## FRONT SUSPENSION

bolts with plain washers each end and 7/16" AF nyloc nuts. You should note that the steering arms must face horizontally forwards.

Again, this should not be fully tightened at this stage. Note that when assembling both the uprights and damper units onto the wishbones the fit will be a little tight. Do not be tempted to use an ordinary hammer to help line up the mountings since this can cause damage, but use a soft copper/hide or plastic/rubber hammer instead. Final lining up can be carried out using a screwdriver. Avoid hammering the mounting bolts into place since this can damage the threads.

4.3 Finally attach the top of the uprights to the top links securing with the 7/16" AF nyloc nuts provided with the top link/knuckle joints, do up fully and tighten to 20-25 lb ft.

4.4 This completes assembly of the front suspension except for final tightening which should be done with the engine in the car and the wheels on the ground.

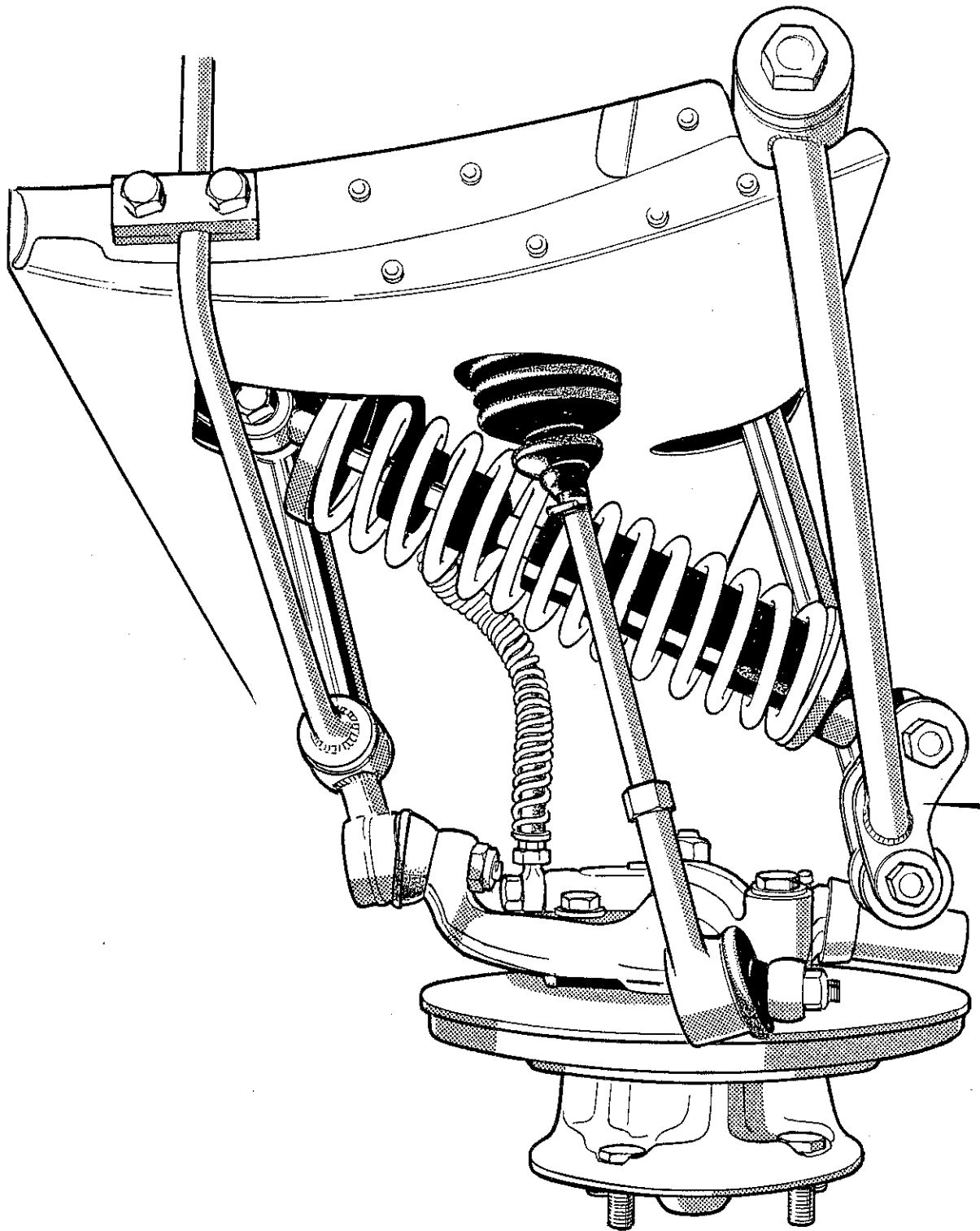
It is important to do it this way since the rubber bushes in the suspension should not be incorrectly preloaded by being stressed when not in the normal running position if premature wear and slight handling irregularities are to be avoided. This point is especially important if the car is to be used for competition purposes.

## FRONT SUSPENSION

We recommend that when finally tightening the 5/16" x 1" bolts which hold the front of the lower wishbones to the chassis spindles Loctite be used to prevent these loosening in service.



Front Suspension - View from front



'N' denotes negative camber wishbone

Fig. 5 A

**Front Suspension - View from above**

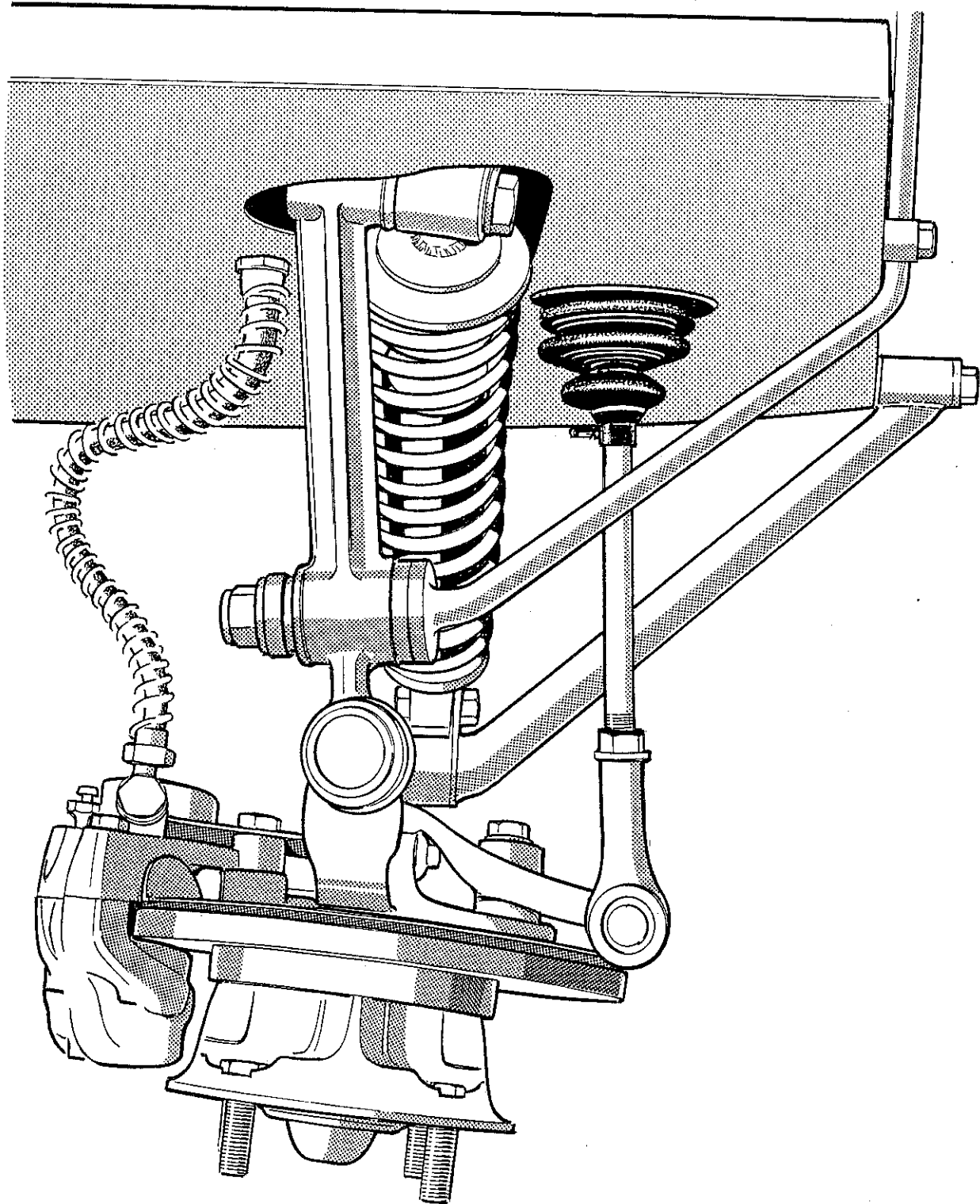


Fig. 5 B

## STEERING

6.1. The steering rack is held in position by two aluminium mounting blocks which are drilled as pairs. These blocks clamp the rack in position as they are bolted in place on the front crossmember. Initially, therefore, clamp the rack into place loosely using the 1/4" x 2<sup>3</sup>/<sub>4</sub>" bolts, nylocs and washers ensuring that a washer is placed between the steel bolt heads and the aluminium blocks. The rack will be tightened later when the column is correctly positioned.

Note that one of the blocks is drilled to take an allen screw and locking nut and this should be fitted to the nearside. This prevents the rack from moving in its mountings and should be left loose for the time being.

The steering rack is unique to the Seven and cannot safely be substituted.

6.2. Installation of steering column.

The steering column is in two pieces which telescope together enabling a small amount of adjustment to suit the individual driver, and also prevent it moving backwards in a forward impact.

2.1 The lower half of the column should be positioned first. Slide the column into position through the dashboard, under the

## STEERING

brake master cylinder, and down towards the rack, splined end downwards. (For disc braked De Dion cars see rear of section)

2.2 Attach the universal joint to the splined end of the column noting how the clamping 5/16" x 1<sup>3</sup>/<sub>8</sub>" bolt and nyloc fit into the cutaways provided. Fit the lower end of the universal joint onto the rack, again clamping with the bolt and nyloc and tighten both bolts.

2.3 The upper half of the column can now be fitted, but a small amount of preparation is advised first. The column is located into a tube within the dashboard by two rubber/metal/nylon bushes. In order to ensure free movement, it will be helpful if you polish the protective coating from the column where it locates into the bushes. The lower bush will already be located in the chassis but the upper one has to be fitted and this should be a close, but not overtight, fit onto the column, which is where the polishing helps.

2.4 Slide the upper half of the column down through the dashboard and telescope it over the lower half. The two halves are held together by the locking clamp. Tighten the two outer 1/4" x 1<sup>1</sup>/<sub>2</sub>" bolts first with the grub screw loose and then tighten the grub screw with an allen key to eliminate any free play in the steering. Lock the assembly with a 5mm locknut.

2.5 Fit the upper bush into the locating tube under the dashboard, noting how the rubber bumps on the bush locate it.

## STEERING

If the rubber is lightly greased, it should push into place easily, but if trouble is encountered, it will help to chamfer off the inner edge of the rubber bumps with a sharp knife.

### 6.3. Tightening and Alignment

3.1 Fit the steering wheel onto its centre boss using the nuts and bolts provided. Temporarily fit the wheel onto the splined end of the upper column and check that the boss does not foul the dashboard. Clearance can be adjusted by slackening the clamp and sliding the two halves of the column relative to each other.

3.2 The track rod ends can now be fitted to the rack along with their locking nuts. These will need to be painted with Hammerite or similar first and as an approximate guide should be screwed on by 24 turns each in order to get the tracking roughly correct. (negative camber wishbones 22 turns)

The outer ball joints should now be attached to the steering arms and the 9/16" AF nuts tightened to 20-25 lb ft., noting that the threaded ends face downward onto the arms.

3.3 Turn the steering from lock to lock and check that the universal joint does not foul any part of the chassis and that the tyres do not foul the body panels. If it does, adjust the position of the rack accordingly. At the same time you should centralise the rack in the chassis as closely as possible, this

## STEERING

being easiest achieved by measuring the gap between the tyre and the bodywork on full lock each way.

When you are happy that the rack is correctly positioned, tighten the bolts holding the mounting blocks. Please note that when the engine is installed there is not much clearance between the lower column and the oil pump housing. We advise that final tightening be left until it can be easily checked.

NB. When cycle wings are specified a different rack has to be fitted to prevent the wings from fouling the bodywork. This rack gives  $2\frac{1}{4}$  turns lock to lock as against  $2\frac{3}{4}$  turns of the normal version and necessarily a poorer turning circle.

3.4 In addition, to finally secure the rack, remove the grub screw and locking nut from the mounting block and drill a slight depression in the rack so as to give the grub screw, when fitted, a good key to prevent the rack either moving from side to side or twisting.

Refit the grub screw, tighten with a 2.5 mm allen key and the lock nut with an 8mm spanner, taking care not to overtighten.

3.5 With the engine installed and the wheels on the ground, the tracking can be set by slackening the lock nuts, rotating the track rods and retightening the lock nuts again. Make certain that the adjustment is made at both ends so that the same amount of thread is visible on each track rod.

## STEERING

Correct wheel alignment should be 10-30 minutes toe in.

### 6.4. Final Assembly

4.1 Establish the straight ahead position and fit the steering wheel onto the column over its splines. Lock this in position with the 1/2" nyloc nut and washer and tighten firmly, finally clipping the centre cap into position.

4.2 Before driving the car on the road, recheck the tightness of all nuts and bolts in the steering system.

### 6.5. Disc Braked De Dion Cars

5.1. These later vehicles are fitted with an enclosed pedal box assembly through which the steering column passes. It will be necessary to remove the lid covering this before the lower column can be fitted.

5.2. Supplied with your basic kit is an aluminium plate approximately 3" square with a large rubber grommet in the middle. This is used to seal the 2<sup>1</sup>/<sub>4</sub>" hole in the front of the footbox through which the steering column passes.

Before fitting the lower column therefore the plate should be slid over it but not secured to the front of the footbox at this stage. The inside of the grommet should be smeared with rubber lube to both prevent wear and ensure water tightness.

## STEERING

5.3. Once the installation of the steering kit is complete and the rack is correctly aligned, this plate should be pop-riveted to the front of the footbox using 4 rivets one in each corner.



## REAR SUSPENSION - DE DION

7.1. The De Dion kit as supplied by Caterham Cars includes all the parts necessary to assemble the De Dion axle including differential, hubs and brakes, drums on earlier cars, discs from early 1988.

It is possible to source some of the components second hand including the differential unit itself and the hub assemblies which are Ford Sierra items. The driveshafts, however, although using Sierra constant velocity joints, are specially manufactured for the Seven.

### 7.2. Installation of Differential

2.1 Before fitting the differential unit, the locating lug on the top rear of its casing must be removed since this can foul the De Dion tube at the full extent of its travel. No more than 3/4" should be removed from the lug . If too much metal is cut away there is a danger that the differential casing will be holed.

2.2 Fit the plastic breather pipe to the top of the diff unit ensuring the 'pips' are aligned.

2.3 Attach the propshaft to the nose of the differential using four special blue bolts, without washers, which are torqued to 42 lb ft using 'loctite' to make absolutely certain they do not

## REAR SUSPENSION - DE DION

come loose in service. Before fitting this however, check that other end is a smooth sliding fit into the back of your gearbox. If not call Caterham at once.

2.4 Noting that the propshaft is an extremely tight fit in the transmission tunnel and its forward universal joint will only fit through one way up, insert it into the tunnel and hang the differential from its upper mounting using the 1/2" x 11" bolt, not securing at this stage.

2.5 The lower, forward mounting is attached to the chassis using two special 12mm x 65mm , 1/2" shank bolts with plain washers under the bolt heads. The differential has to be located centrally in the chassis and this can be achieved using the thin 7/8" diameter washers in equal numbers each side. Take care not to force too many washers between the chassis and differential since the small amount of free movement allowed by the rubber bushes will be eliminated, causing excessive noise and vibration to be transmitted into the car. However, all the play should be taken up by the washers.

It is advised that as a double check on the central location of the differential, you measure the distance between the outer edge of the differential and the inner edge of the outer chassis tubes which should be identical within 2mm.

2.6 Remove the 11" bolt from the upper mounting and centralise with washers in the same way. Tighten this to 40 lb ft.

## REAR SUSPENSION - DE DION

2.7 Tighten the two lower mounting bolts to 40 lb. ft.

2.8 The rear mounting points on the differential are redundant on the Seven.

### 7.3. Assembly of De Dion Tube

It is perfectly possible to install the De Dion tube and the rear suspension with rear wings and petrol tank in place, but access is made considerably easier if they are removed, in particular the wings which are bolted on.

3.1 Place the De Dion tube into the chassis noting that the outer 'ears' face forward and the 'A' frame mounting downward. This is a tight squeeze between the differential and petrol tank.

3.2 Fit both driveshaft assemblies into place inserting their inner (unthreaded) ends into the differential taking care not to damage the seals. These are handed left (nearside for a RHD car) and right (offside).

3.3 Fit the rear taper roller bearings into the hub carriers. These bearings are identical and supplied as matched pairs. The outer housings should be pressed into the hub carriers using either a vice or gently tapped into place using a hammer and suitable drift taking care not to damage the bearing face.

Note that each bearing outer housing should be fitted with its smaller inner diameter innermost into the hub carrier.

## REAR SUSPENSION - DE DION

The inner races and the hub itself should be liberally packed with grease and the races then pushed into place. The seals can now be pressed carefully into position. (see diagram 7.3.3.)

3.4 Position one of the cast aluminium De Dion ears (these are not handed) over one of the driveshafts and attach to the De Dion tube. Bolt this into place using the 10mm x 40mm bolts with plain and spring washers into the tapped holes which are rearmost on the De Dion tube ear. It is possible that these bolts will not go fully home due to the depth of thread available. Should this be the case, add an additional plain washer in order to space out the bolt. Do not fully tighten at this stage, but when you DO, use Loctite to ensure these bolts do not work loose in service.

Note that the countersunk small diameter holes in the ears are redundant and are for manufacturing purposes only.

### 3.5 Drum Braked Cars

Position the rear hub carrier into a brake back plate and slide the hub over the end of the driveshaft taking care not to damage the bearing seals. The brake back plate should be positioned with the hydraulic slave cylinder uppermost and the handbrake cable locating guide to the lower front. Bolt the hub through the backplate and onto the De Dion ear using 10mm x 55mm bolts, plain washers and nylocs at the front and 10mm x 65mm bolts and nylocs to the centre.

## REAR SUSPENSION - DE DION

The plain washers should be positioned against the alloy ear, but are not needed on the steel De Dion tube. All these bolts, including those fitted in 3.4 above, should be tightened to 35 lb ft.

### 3.6 Drum Braked Cars

Slide one of the rear hubs onto the splined end of the driveshaft and ease into position through the seals into the hub carrier. Place a thick 22mm x 45mm diameter washer over the remaining thread and secure with the respective large nyloc nut (LH white insert, RH green insert), noting that the lefthand nut has a lefthand thread. These should be tightened to approximately 30 lb ft for the time being and will be quite stiff to wind up. The final torque on these nuts is 200 lb ft and this is most easily achieved with the car standing on its wheels and the brakes applied.

### 3.7 Disc Braked Cars

The assembly of the rear discs onto the De Dion axle is basically similar to the instructions contained in 7.3.5 and 7.3.6.

The De Dion ears are different however and include an additional flange to locate the brake calipers which operate onto the top of the disc. (see figure 7.3.7.)

The drive flanges are specially modified Ford items in order that brake discs identical to those fitted at the front can be attached.

## REAR SUSPENSION - DE DION

The discs are bolted to these flanges using 4 3/8" x 5/8" UNEF crown head bolts each side using Loctite and torqued to 30 lb ft

The hub carrier and bearing assemblies are identical to the drum braked car and are bolted to the De Dion ears in the normal way using 10mm x 55mm bolts plain washers and nylocs at the front and 10mm x 65mm bolts and nylocs at the rear tightening to 35 lb ft and not forgetting to tighten the rearmost bolts fitted in 7.3.4.

### 3.8 Disc Braked Cars

The rear hub flanges with discs fitted should be slid onto the splined end of the driveshaft and secured as in 7 3 6.

### 3.9 Disc Braked Cars

The brake calipers are handed and should be fitted with the handbrake cable abutments towards the front of the car. Slide over the disc, separating the brake pads, and bolt into place on top of the De Dion ears using the 10mm x 55mm bolts with the spacers fitted between the ear and the caliper. Loctite should be used and the bolts tightened to 35 lb ft.

3.10 This operation should now be repeated for the opposite side

## REAR SUSPENSION - DE DION

### 7.4. Assembly of Rear Suspension

4.1 Hang the rear spring/damper units from their mountings at the top of the spaceframe, noting that a washer/rubber bush/washer combination should be both above and below the mounting and secure with a 3/8" UNF plain nut, noting that there are two of these each side. Do NOT fully tighten at this stage.

4.2 Twist the damper units so that the adjusting screws face inward toward the centre of the car and slide a greased 1/2" x 5 1/2" bolt through the De Dion tube from the rear and secure the damper to the tube using a plain washer either side of the bush with a thin nyloc nut.

4.3 Fit the radius arms to the chassis (offset inwards) at the forward end of the wheelarch using 3/8" x 3 1/2" plated caphead bolts passed outward from the cockpit and secure with plain washers on the outside of the radius rod bushes and nyloc nuts. Do NOT tighten at this stage. It may be necessary to trim the wing flange to gain adequate clearance around the radius arm front mounting.

4.4 Attach the rear end of the radius rods to the brackets on top of the De Dion tube using 1/2" x 2 1/2" bolts and nylocs passed outward from the centre of the car, not tightened as yet.

4.5 The 'A' frame can now be fitted (either side up) to the

## REAR SUSPENSION - DE DION

lower chassis tube at the front of the rear axle bay, using 1/2" x 4" bolts, plain washers and nylocs. This should be carefully centralised by using thin washers between the outside of the 'A' frame and the inside of the chassis, and you should also ensure that all side to side free movement is eliminated. Again, do not fully tighten yet.

4.6 Fit two rubber/metal half bushes into the socket at the rear of the 'A' frame and fit this up into the bracket hanging downwards from the De Dion tube, securing with a 1/2" x 4<sup>1</sup>/<sub>2</sub>" bolt and nyloc. This will be a somewhat tight fit since the bushes need to be compressed into their socket before the resultant assembly can be fitted to the De Dion tube and we recommend using rubberlube on the bushes to aid compression. It may be helpful to use two thin strips of metal each side of the De Dion bracket in order to 'shoehorn' the 'A' frame into position.

4.7 To check that the De Dion tube is centralised in the chassis measure the gaps between the De Dion ears and the outer edge of the chassis tubes which should be identical to within 2mm.

### 7.5. Final Assembly

5.1 Fit the brass brake pipe union to the threaded stud protruding from the De Dion tube, input uppermost, and attach using a 1/4" UNF nyloc nut and spacer.



## REAR SUSPENSION - DE DION

5.2 Bend the steel brake pipes to fit as tightly as possible to the De Dion tube and attach to both the union and respective slave cylinder or brake caliper, tightening to 5-7 lb ft. This tubing is readily bent by hand, but take care to avoid any sharp kinks or bends of less than 1" radius since this can lead to weakening and possible brake failure. Due to the design of the calipers (disc braked cars only) a small amount of movement needs to be taken up as the pads wear and therefore the brake pipes where they enter the caliper should not be bent tighter than a 3 to 4 inch radius.

5.3 Secure the brake pipes to the De Dion tube using the long ty-wraps provided and check carefully that the pipes do not foul any part of the suspension or chassis. The pipe must run along the top of the tube, not the front.

### 5.4 Drum Braked Cars

The handbrake cable can now be fitted. This is double ended and is designed to be attached to both rear drums and to be pulled from the centre by the separate forward cable attached to the handbrake lever itself. (see Miscellaneous section). Feed the centre of the cable (inner only) up through the transmission tunnel and note that location points are provided for the cable outers at the differential end of the tunnel.

Unscrew the knurled nyloc adjusters on the cable to ensure plenty of slack. Fit each end of the cable into the respective brake drum, noting that the cables are above both 'A' frame and

## REAR SUSPENSION - DE DION

lower chassis rail. The nipples on the end of each half of the cable fit into the rear brake shoes which do not need to be removed, merely sprung out of place. The cable outer is secured by the brake back plate.

Do not remove the clip on the shoe retaining pin as this is not necessary and may lead to the pin falling between the backplate and the aluminium ear where its retrieval is difficult.

Lastly, the rubber grommets which have been fed over both ends of the cable should be attached to the chassis diagonal tubes using Ty-wraps. This prevents the cables from contacting the driveshafts or the chassis tubes as the suspension moves.

5.5 The brake drums can now be fitted.

### 5.6 Disc Braked Cars

The handbrake cable is supplied with different fittings at the caliper ends to those supplied with drum braked cars and is therefore not interchangeable.

---

Feed the inner ends of the cable through the abutments in the caliper and hook over the brake levers. Otherwise adjust as in 7.5.4.

5.7 In order to avoid any incorrect preloading of the rubber bushes in the suspension, the securing bolts should be tightened with either the wheels on the ground or the car's weight taken by the De Dion tube. Axle stands are ideal for this purpose.

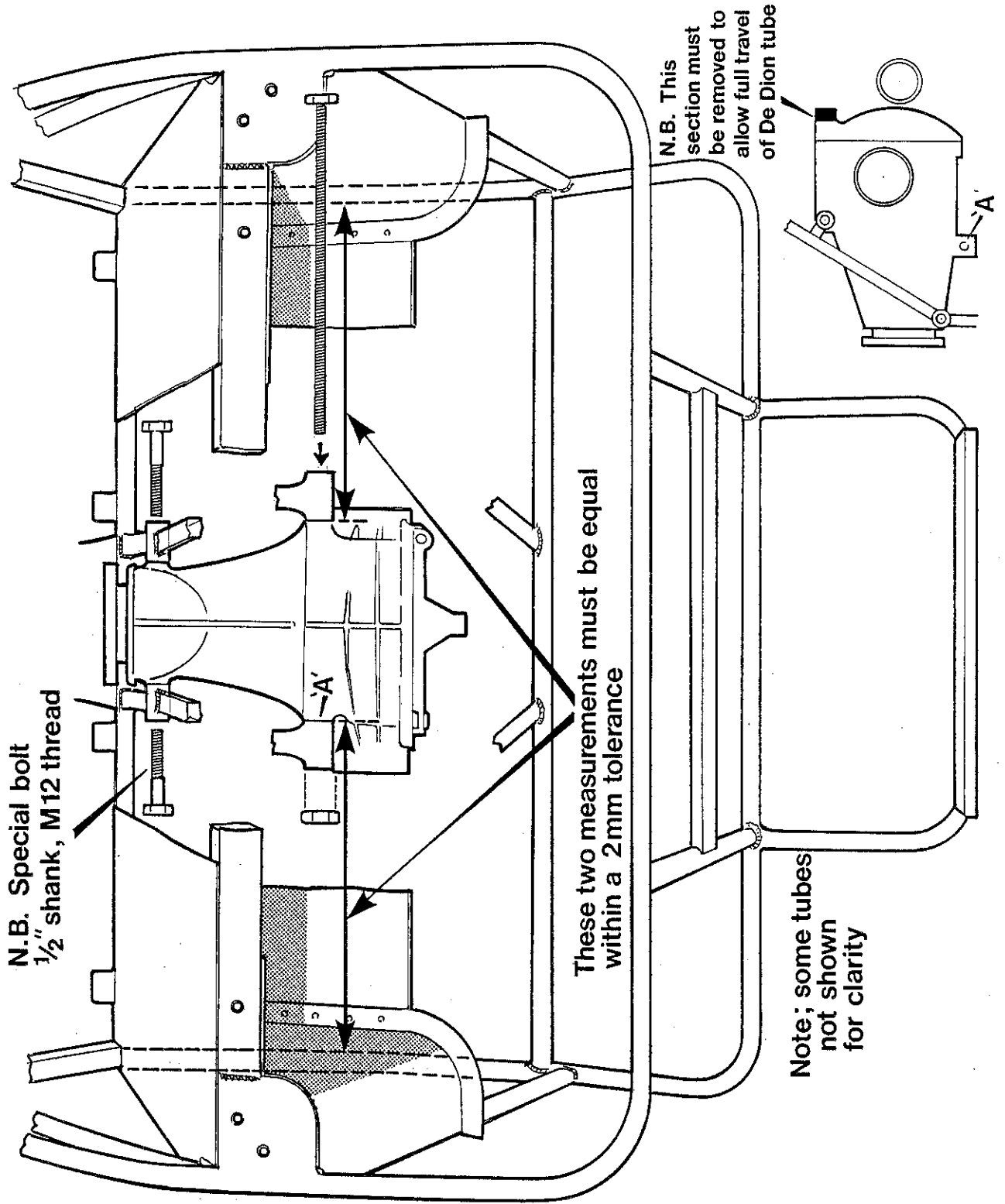
## REAR SUSPENSION - DE DION

5.8 Tighten firstly the damper mountings to the chassis using the lower 3/8" UNF nut until the rubber bush assumes the same diameter as that of the washers holding it. Lock this nut with the second identical one and lastly place a black rubber cap over the protruding thread.

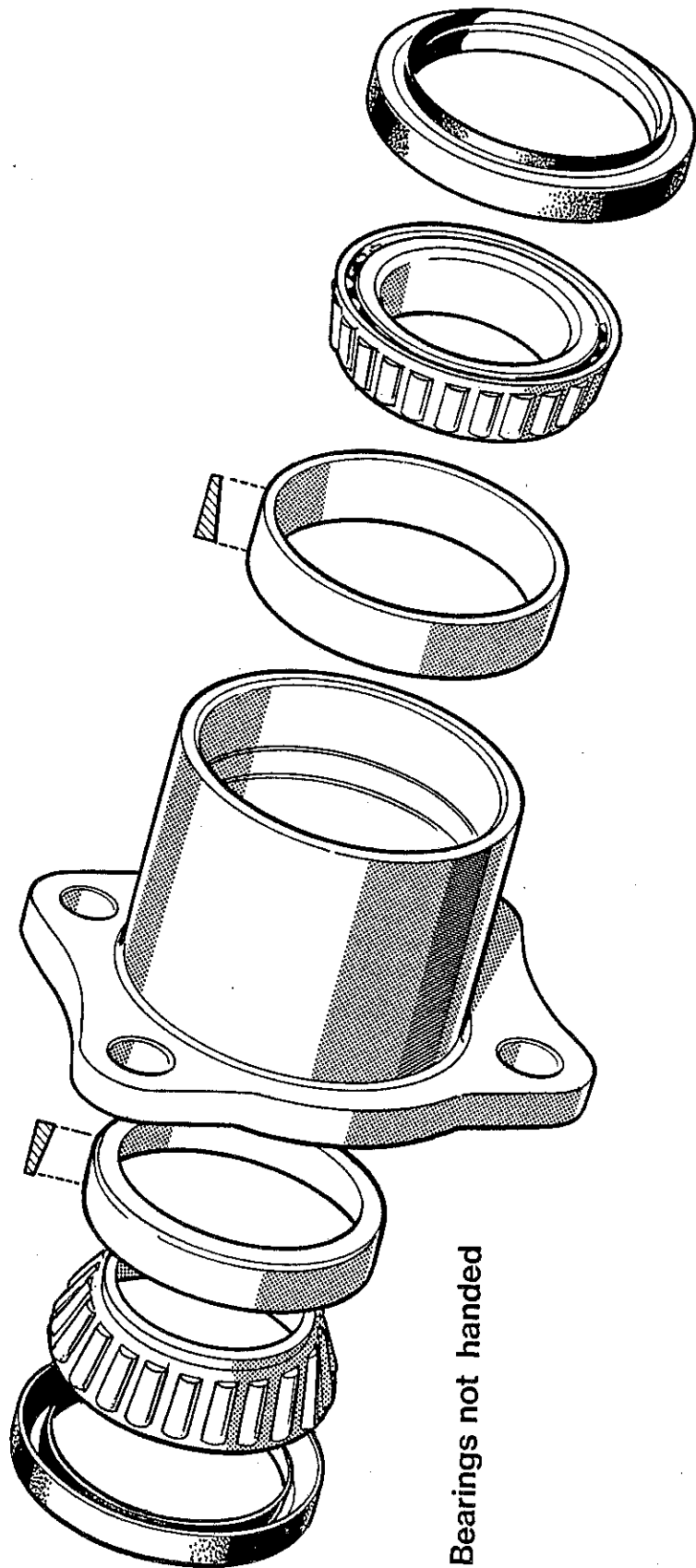
5.9 Tighten all the bolts through rubber bushes securing the rear suspension as follows. The 1/2" bolts should be tightened to 40 lb ft and the 3/8" bolts to 35 lb ft.

5.10 Finally, with the wheels on the ground and the brakes on, torque the rear hub nuts to 200 lb ft. Since most domestic torque wrenches do not reach this figure, it may be necessary to visit your local garage for assistance.

# Position of Differential Unit



**Rear Hub - Bearing Arrangement (De Dion cars)**



Bearings not handed

Fig. 7.3.3

**Rear Hub Assembly - De Dion Rear Suspension  
(Viewed from below)**

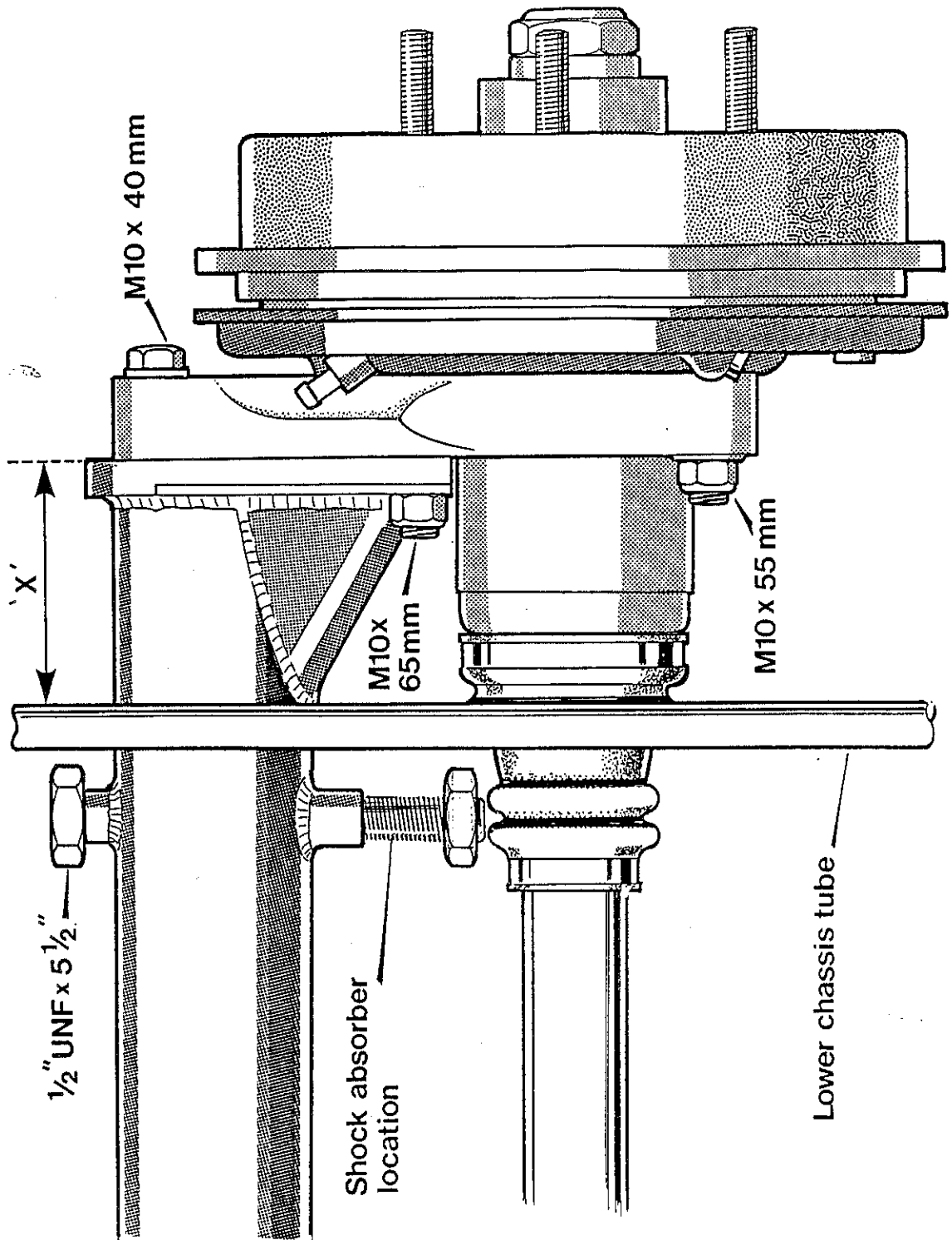


Fig. 7.3.4 - 5

**General View Rear Disc Brake Assembly**

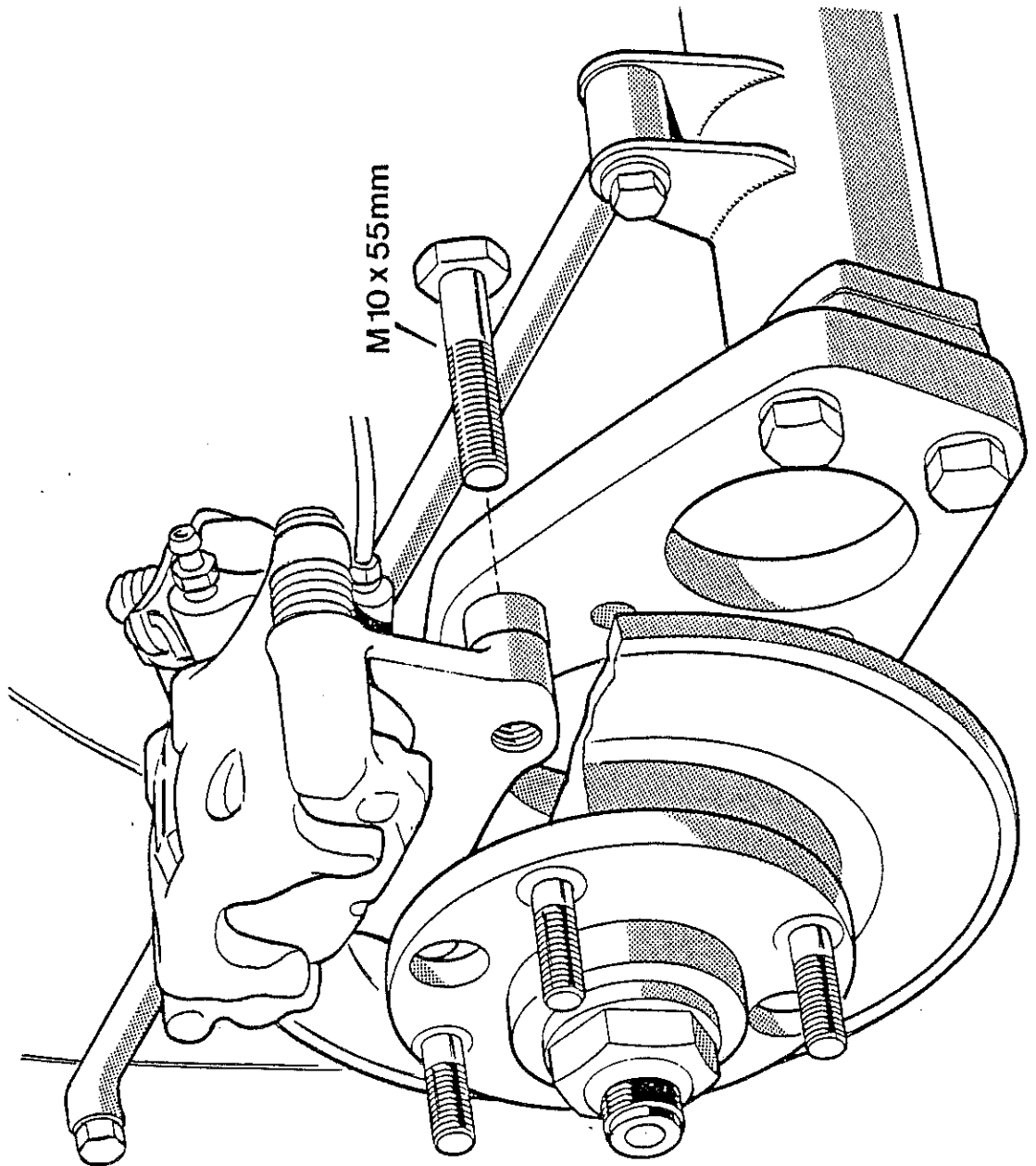


Fig. 7.3.7A

# De Dion Rear Hub Assembly - Disc Brakes

( viewed from above )

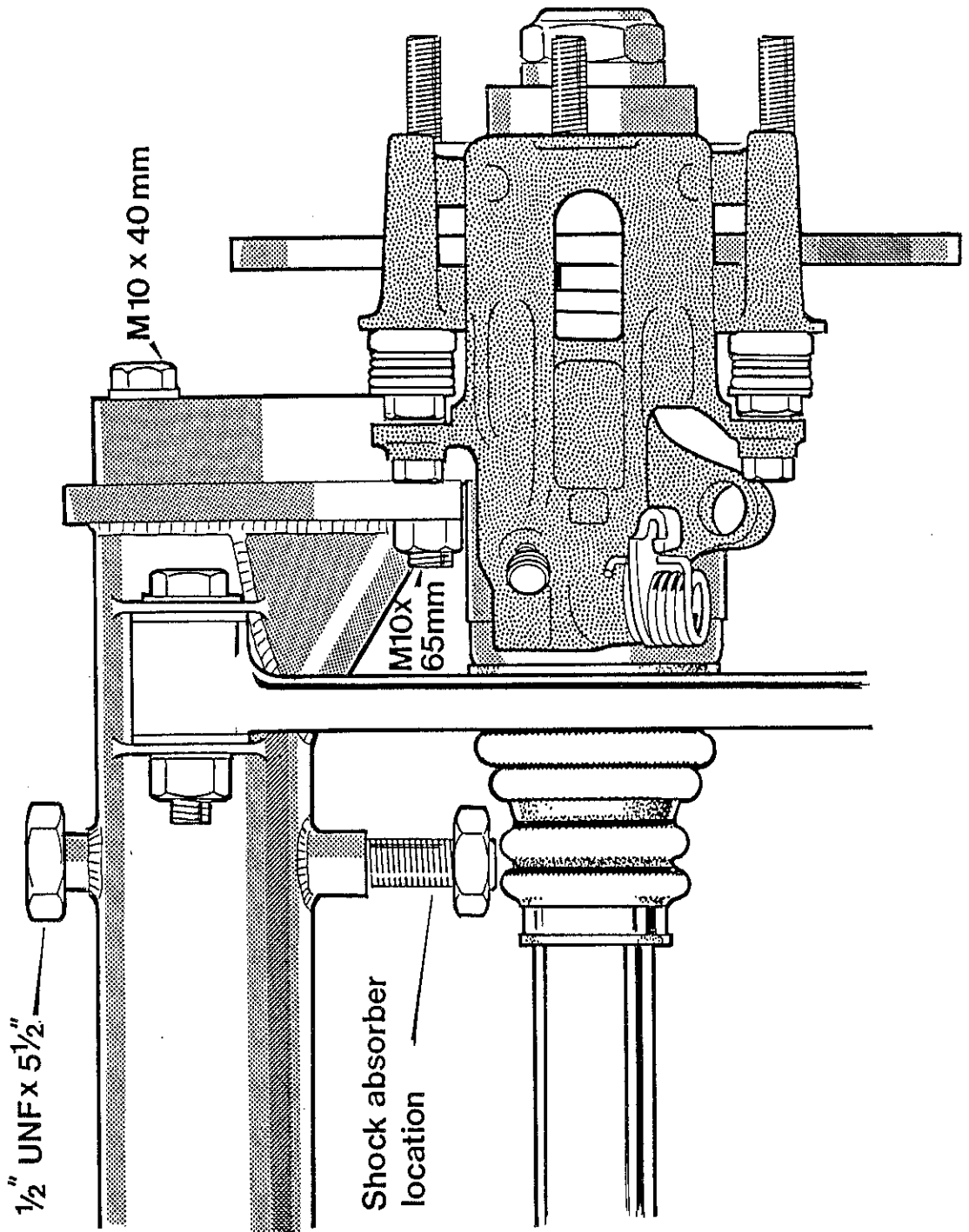


Fig 7.3.7B



## REAR SUSPENSION - LIVE AXLE

There are two types of axle suitable for the Caterham Seven, the rear wheel drive Ford Escort and the Morris Marina or Ital. Neither of these is available through Caterham Cars, although we can supply spare parts for both axles.

To reiterate the points stated earlier in this manual, we recommend the Marina/Ital option which has been the most recent Caterham specification until its supersession by the De Dion.

Either axle is readily available second hand, although the ideal Escort axle is that fitted to the RS 2000 which is not only stronger but provides larger brake drums and a 3.54 final drive ratio. It is also difficult to obtain!

The best Marina/Ital axle is that from the 1700cc, 1800cc or 2000cc versions which has a 3.64 final drive ratio.

If you obtain an axle from a car breaker, much heartache may be avoided by exchanging it for a reconditioned axle. 'Exchange and Mart' provides a plentiful source of reconditioners.

### 8.1. Preparation of Axle

1.1 Either axle should be drained, thoroughly cleaned and your name painted on the casing before being brought down to Caterham to have the suspension mountings and strengthening

## REAR SUSPENSION - LIVE AXLE

plate welded on. Note that the Escort axle will also need to be dismantled to a bare casing, with differential, halfshafts, hubs and brakes removed before it can be modified.

1.2 It takes about three weeks to modify your axle and when collected from Caterham, it will need to be painted prior to assembly into the car.

Hammerite is ideal for this purpose since it needs no primer and provides a surface well able to sustain life under the car.

1.3 For either axle we recommend that you use new wheel cylinders and brake shoes and that the handbrake mechanism and brake adjusters are thoroughly overhauled.

### 8.2. Assembly of Axle before Installation

The miscellaneous kit contains all the parts necessary to install the axle into the Seven, and although it is possible to fit the axle into the car first, the following tasks are considerably easier if the axle is out of the car.

2.1 Fit the hydraulic brake pipes to the axle bending to the correct shape as you do so. The long pipe provided in the kit fits between the wheel cylinders and follows the contours of the axle.

The short pipe fits to the offside (driver's side on RHD cars) wheel cylinder and should be bent so that its input end finishes

## REAR SUSPENSION - LIVE AXLE

adjacent to the mounting provided for the flexible hose. Drill the axle brace to accept the black plastic clips which secure the pipes in place.

Each wheel cylinder is provided with an input and a bleed hole. The offside cylinder dispenses with the bleed nipple and the pipe running across the axle should be connected into the upper hole in the cylinder from which the nipple has been removed.

The nearside cylinder retains its bleed nipple in the upper hole of the cylinder and is used to bleed the entire rear half of the brake system.

2.2 Attach the handbrake strap and its backplate to the bracket provided on the nearside of the axle using two 1/4" bolts, washers and nylocs. Fit the long handbrake rod to this strap with a nut each side of the mounting hole, after passing it through the mounting provided on the axle brace, and attach the other end to the handbrake lever with a clevis pin and lock in place using a small split pin. (see diagram 8.2.2.)

2.3 The handbrake cable can now be fitted with its outer casing located into the handbrake strap and the inner cable attached to the nearside brake lever with a clevis and split pin. Leave the adjustment slack for the time being. (See diagram 8.2.2. for clarity).

2.4 Fit the plastic axle breather to the axle casing in the threaded hole provided.

## REAR SUSPENSION - LIVE AXLE

### 8.3. Installation of Axle and Rear Suspension

3.1 Hang the coil spring/damper units from the upper mountings provided on the chassis noting that there should be a washer/rubber bush/washer combination both above and below and that there are two 3/8" UNF nuts on each damper.

Do NOT fully tighten these at this stage.

3.2 Using the long 1/2" x 4<sup>1</sup>/<sub>2</sub>" bolts, washers and nylocs, fit the bottom of the dampers to the axle noting that the adjusting screws should face to the rear of the car. The axle should now be suspended by the damper units.

3.3 Attach the radius arms to the outboard end of the same bolt ensuring that there is a plain washer either side of the bush. Secure with the nyloc nut but do not fully tighten at this stage.

3.4 Attach the forward ends of the radius arm to the chassis using the 3/8" x 3<sup>1</sup>/<sub>4</sub>" plated button head bolts, washers and nylocs, passing these bolts outward from the cockpit. Again, do NOT fully tighten yet.

3.5 Fit the 'A' frame to the chassis locating its forward end inside the main lower chassis tubes at the front of the rear axle bay, noting that the central mounting at the rear should face upward.

## REAR SUSPENSION - LIVE AXLE

This 'A' frame locates the axle laterally and it is important that it is fitted centrally so as to ensure that the axle is also centred. Attach to the chassis using the 1/2" x 4" bolts, washers and nylocs, passing these in from the outside, but centre using the thin 7/8" external diameter washers provided. This should also be used to eliminate any side to side movement of the 'A' frame.

3.6 The 'A' frame is attached to the bracket welded onto the differential casing using a 1/2" x 2<sup>1</sup>/<sub>2</sub>" bolt and nyloc and the split metal/rubber bush. The two halves of the bush are pressed into the socket provided in the 'A' frame and then captured within the axle bracket.

This job can be a little difficult since the two halves of the bush need to be compressed together in order to make it fit. We suggest you coat the outside of the bushes with rubber lube to make compression easier and if it still proves difficult, use a couple of strips of thin aluminium or steel in order to shoehorn the bush into place with either a jack or a soft hammer.

Secure with the bolt and nyloc, but do not fully tighten yet.

### 8.4. Final Tightening

4.1 Before finally tightening the axle and rear suspension mountings, it is advisable to have the car's weight supported by the axle as it would be when on the road in order that no

## REAR SUSPENSION - LIVE AXLE

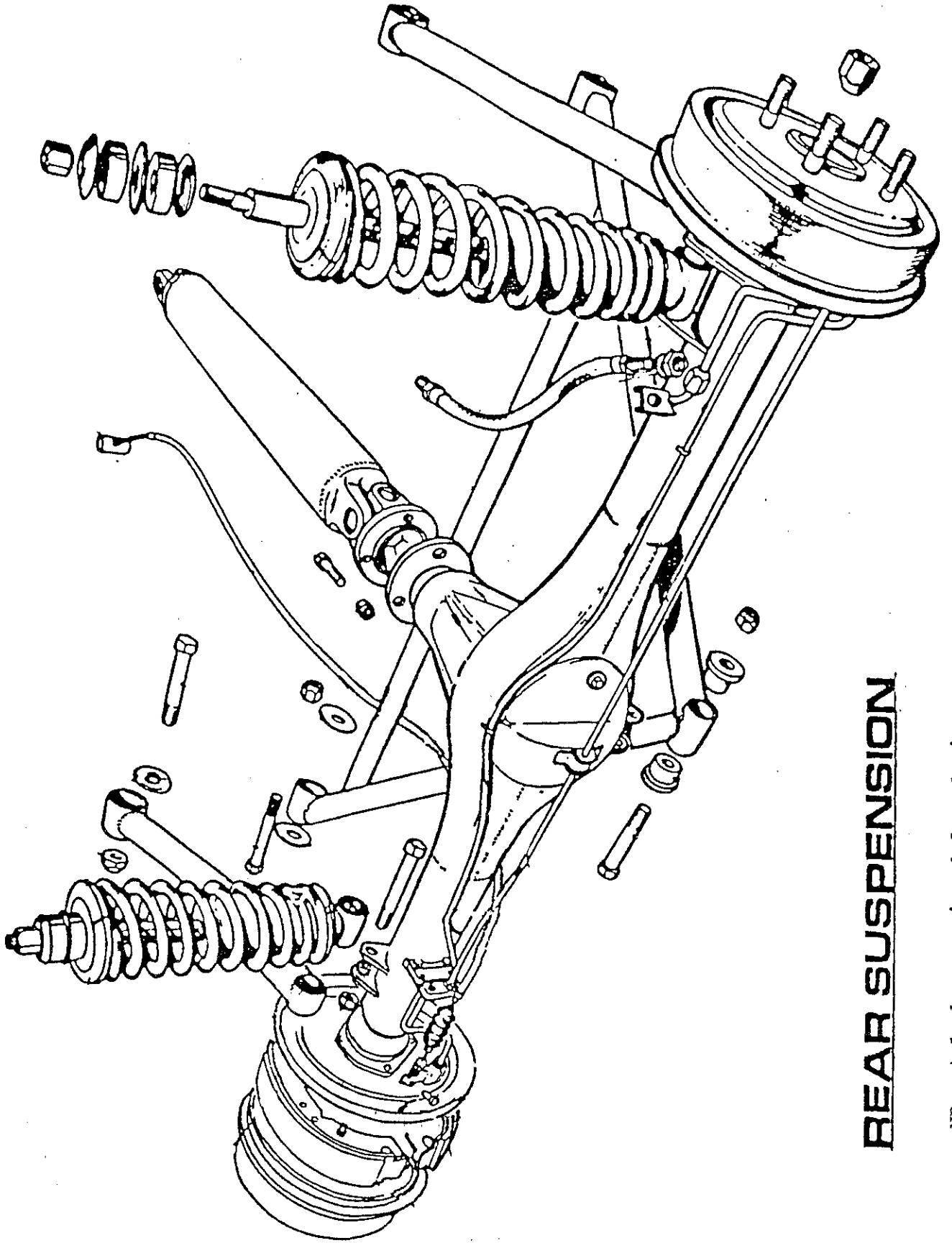
unwanted preloadings are present in the bushes. Axle stands are ideal for this purpose.

4.2 Tighten firstly the damper mountings to the chassis using the lower 3/8" UNF nut until the rubber bush assumes the same diameter as that of the washers holding it. Lock this nut with the second identical one and lastly place a black rubber cap over the protruding thread.

4.3 Tighten all the bolts securing the axle to the following torque settings. The 1/2" bolts should be tightened to 40 lb ft and the 3/8" bolts to 35 lb ft.

4.4 Finally, check the distance between the brake back plates and the lower chassis tubes on both sides. These dimensions should be equal within a tolerance of 3mm.

If they are not, and your back plates are not distorted, the 'A' frame centering can be adjusted by moving spacing washers from one side to the other.



## REAR SUSPENSION

NB: Axle brace omitted for clarity

**Hand Brake Cable Installation**

**Live Axle**

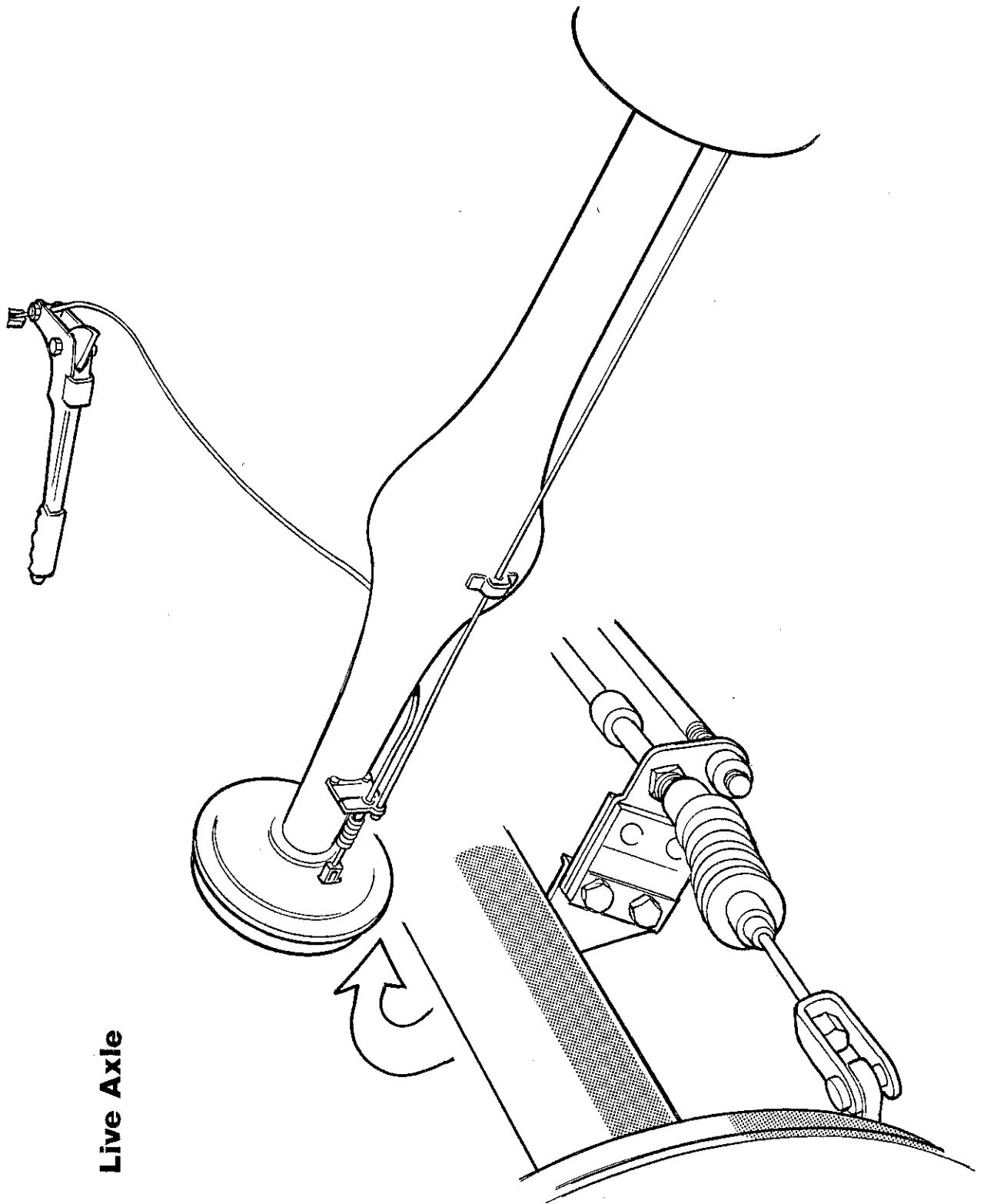


Fig. 8.2.2



## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

The miscellaneous kit consists of all the items necessary to finish off your car which are not included in the other kits. As such, it is not assembled as a unit and needs to be fitted in conjunction with other areas of the car.

Not having acquired this kit, however, will not prevent you from fitting the other kits first, although it will not be possible to install the engine and gearbox without it.

Items not specific to engine and gearbox installation are as follows:-

- 9.1. Brake Hoses
- 9.2. Handbrake mechanism - De Dion
- 9.3. Handbrake mechanism - live axle
- 9.4. General items
- 9.5. Trim Items

## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

### 9.1. Braking System

1.1 Feed the brake hose protector coils over each front brake hose. This is most easily done by winding the pipe into the coil.

1.2 Attach the inner end of each brake hose through the hole provided in the aluminium body side. Secure this in place with the 3/8 UNF nut provided with the lock washer between the nut and the inner body side. Do NOT tighten yet.

Particular attention should be paid to the Right Hand hose which screws into a 3 way union fitted to the chassis adjacent to the hole in the body side. Tighten this connection fully before securing the lock nut attaching the hose to the body side. (9.1.5)

1.3 The outer end should be attached to the brake caliper using the special banjo bolt provided with a copper washer between the bolt head and the hose union, and the hose union and the caliper body. Be careful not to over tighten this.

1.4 Turn the steering from lock to lock and watch carefully that the hoses do not foul on the suspension. If they do, a small amount of twist can be put into the hoses by adjusting the inner fixing onto the body side.

Please note that if Stainless Steel braided "Aeroquip" hoses are

## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

being used this problem is more likely to occur and it may help to undo the connection into the caliper and twist the hose through 180°.

1.5 Once positioned, the Left Hand locking nut can be tightened securing the hose to the body side and the inner male union connected to the matching female union on the end of the steel brake pipe.

1.6 The rear hose can now be fitted. On De Dion cars the hose should first be screwed into the 'T' union on the De Dion tube and tightened before attaching to the bracket mounted on the chassis with nut and lock washer. On live axle cars the hose is attached to the bracket on the axle with nut and lock washer, then connected to the union on the metal pipe to the wheel cylinder.

Lastly, the hose should be connected to the steel pipe under the rear bulkhead which may need a little careful realignment in order to do up properly. Note that if steel hoses have to be bent, sharp kinks must not be created since if pipes are overstretched in this way, failure in service is possible.

Note also that all brake connections should be kept spotlessly clean and contamination with oil, water or petrol must be avoided. Connections should also be finger tight initially. If a spanner is needed then there is a real chance of damaging threads which will prevent a safe joint being made.

## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

1.7 Finally, before filling with fluid, recheck all brake connections, including ours, from master cylinder through to each caliper or wheel cylinder and ensure they are properly tightened.

Brake fluid used should comply with SA3J 1703 DOT 3 specification and must be fresh. Once a container has been opened it is rapidly contaminated by moisture in the air. We recommend the use of Castrol/Girling brake fluid and use it in production at Crayford.

The master cylinder should be filled first, with all bleed nipples closed. Carefully bleed the system using slow strokes of the brake pedal starting at the nearside rear, then the nearside front and, lastly, the offside 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.

De Dion cars will also need bleeding from the offside rear and this should be done immediately after the nearside rear.

DISC BRAKED DE DION CARS are supplied with an Easibleed brake bleeding device, separate instructions for which are included with it. Great care must be taken to ensure that the Easibleed cap attached to the top of the master cylinder is firmly and correctly seated. Brake fluid under pressure can be dangerous to eyes and can damage paintwork if it escapes.

## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

As a check on the system's integrity, get someone to hold the brake pedal down for about a minute whilst you check all connections and bleed nipples for any sign of leakage. The pedal should remain solid. If it slowly sinks, there is a leak somewhere in the system.

On disc braked De Dion cars fitted with new pads, pedal travel may seem excessive despite being fully and properly bled. In use however the system will improve dramatically with normal use (500-1000 miles).

### 9.2. Handbrake Mechanism - De Dion

2.1 Before assembly can commence the handbrake lever needs to be bent at an angle of between  $15^{\circ}$  and  $30^{\circ}$  to clear the transmission tunnel. (see diagram 9.2.1.)

First dismantle the ratchet mechanism by undoing the 1/4" UNF pivot bolt and nyloc and then, after unscrewing the handbrake knob, withdrawing the locking rod. Bend the handbrake using a bench vice (and similarly the locking rod separately) to an angle sufficient to clear the transmission tunnel.

2.2 Fit a rubber grommet into the hole at the top front of the transmission tunnel and feed the handbrake cable through this into the passenger compartment locating the end of the inner cable into the lug under the front bulkhead.

## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

The handbrake lever can now be assembled onto the cable with the handbrake barrel to locate the cable outer and bolted into place under the bulkhead using the 7/16" x 2<sup>3</sup>/<sub>4</sub>" bolt and nyloc as the handbrake pivot and the 1/4" x 2<sup>3</sup>/<sub>4</sub>" bolt and nyloc to locate the handbrake ratchet.

You will be working against the spring at the other end of the cable as this is installed under tension.

2.3 The longer handbrake cable will have been installed into the rear brake drums or discs as part of the rear suspension assembly and this should now be connected to the front cable. The clevis pin is slid downward through the twin eyes of the front cable capturing the nyloc pulley around which the cable should be fitted. This clevis is secured by a small 'R' pin.

2.4 The handbrake can now be adjusted using the nylon knurled nuts threaded onto the rear cable from underneath the car. Take care to ensure that it is not adjusted too tightly and that the rear shoes or pads are not binding. Ideally the handbrake should lock the rear wheels on about three clicks of the ratchet mechanism.

When correctly adjusted the forward nut is locked into place with the second knurled nut fitted to the cable.

## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

### 9.3. Handbrake Mechanism - Live Axle

3.1 The handbrake lever must be modified as described in 2.1

3.2 The cable is attached to the lever and the lever is mounted in the car in exactly the same way as described in 2.2, except that instead of there being a two part cable, it is supplied in one piece.

3.3 The handbrake can be adjusted in two places; where the cable outer meets the strap on the rear axle, and where the handbrake rod crosses from the same strap to the offside brake lever.

Firstly adjust the rod until there is an even amount of slack at both brake levers and then adjust the cable itself until the handbrake locks both back wheels after about three clicks of its ratchet.

## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

### 9.4. General Items

#### 4.1 Screen Washer Kit

This is fitted on the front bulkhead to the offside of the brake master cylinder (RHD cars) where holes are pre-drilled to take the mounting bracket which is riveted or bolted in place. Attach the clear plastic tubing to the plastic washer jet after first removing the securing nut. Slide the tubing down through the hole in the centre of the scuttle and secure with the nut which is fed back over the tubing. Note that there should be a rubber washer between the jet and the top of the bodywork.

Route the tubing through the wiring loom behind the dashboard to prevent it falling down into view and pass it through the large rubber grommet above the steering column and attach to the washer motor, trimming to length as necessary.

The motor is connected with the green/black wire to the (+) terminal and the black to the (-) terminal.

#### 4.2 Horns

The twin electric horns are fitted to a stud attached to the main front lower chassis crossmember below the steering rack. Use the spacers provided to raise the horns as high as possible from the ground without touching the underside of the rack mounting. (For air horns see options section)

Note that the horns are handed and should be positioned with



## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

their electrical contacts facing each other in order that the wires can reach.

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

### 4.3 Battery

The battery is located at the bottom offside rear of the engine compartment and its base hooks under the lip provided in the tray and is secured using the spring clip.

The battery should be positioned with its earth (-) connection forward and this black lead connects to the engine block where the mounting is attached. The live red lead is connected to the positive (+) terminal and should be routed down to the lower offside diagonal bracing tube, around the tubular crossmember under the gearbox and back along the nearside diagonal where it is connected to the starter solenoid.

Attach the cable with plenty of tyrapas and take care to prevent it from hanging down below the car.

**IMPORTANT:** The battery must be disconnected until the engine is installed and all electrical equipment properly connected.

When reconnected, **ALWAYS** attach the live lead before the earth to prevent a short circuit should a spanner contact part of the car while the connection is being tightened.

## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

Although at first sight it would appear difficult to remove the battery with the engine in place, it is actually straight forward to slide it on its edge backwards and downwards past the front of the footbox and out from underneath the car.

### 4.4 Fuel Filler

This should be fitted in conjunction with the boot floor contained in the interior kit. With the boot floor in place, attach the rubber filler pipe to the tank filler and check that its upper end aligns with the hole in the rear panel, trimming as necessary. Secure with one of the large jubilee clips. Insert the large rubber grommet into the filler hole and attach the filler neck with its locking cap through into the pipe, securing with the second large jubilee.

### 4.5 Coil

This attaches to the top front face of the driver's footwell (RHD cars) by two 1/4" x 3/4" bolts . Attach the white/black wires to the negative connection and the white wire to the positive.

## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

### 9.5. Trim Items

#### 5.1 Scuttle Edge Trim

This strip is designed both to finish off the edge of the scuttle around the dashboard tidily and to protect occupants from the hard aluminium edge. It will need to be trimmed to length.

#### 5.2 Radiator Grille

This is attached to the front of the nosecone which, having established the correct alignment, should be drilled as appropriate. The grille is secured from behind by four metal spire clips which are a tight force fit.

#### 5.3 Badges

Factory built cars normally have their badges fitted to the rear wings, below the rear lights and above the reversing lights, 'Caterham Cars' on the nearside and 'Super Seven' on the offside.

#### 5.4 Mirror

This is stuck by its self adhesive pad to the windscreen as high up as possible on the centreline of the car.

#### 5.5 Seat Belts

Mountings are fitted which comply with all Construction and Use regulations (including German TÜV) and static lap and diagonal

## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

belts designed specially for the Seven are available from Caterham Cars. The law in the UK states that an occupant must be able to do up or undo a seat belt with one hand, hence full harness belts, despite their obvious safety benefits, are not strictly legal for road use. In practice, however, a large number of Seven owners use harnesses and their mountings are now standardised in the chassis.

Due to the size and design of the Seven, Saloon car type harnesses are not suitable and specially made belts produced by LUKE are available from Caterham Cars.

### 5.6 Front and Rear Wings

Front: Attach to the chassis the front and rear wing stays, the fronts also incorporating the headlamp mountings, not tightening at this stage. Please note that these are handed and once in place the rear stays should face backward and the headlamp brackets forward. Chassis manufactured from mid 1988 will not be fitted with rear stays and the side panel mountings are strengthened.

The wings are pre-drilled to line up with the riv-nuts fitted to the side panels and are attached with 5mm x 20mm bolts and 3/4" plain washers. The rubber piping supplied should be cut to length and cut in a series of "V"s in order to allow for the wing bolts.

With piping in place attach with the 5mm bolts and drill down

## INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

through both the wings and their stays and secure with the 1/4" galvanised bolts and square nuts provided. It is important to ensure that the front stays are vertical.

Rear: The rear wings are secured using 5mm x 20mm bolts into riv-nuts at the front and nyloc nuts into the rear six mounting holes again using 3/4" plain washers and are pre-drilled accordingly.

As with the fronts rubber beading is provided and this should be trimmed as appropriate.

Cycle Wings: These are bolted onto the tubular brackets fitted to the front uprights using 4 bolts on each side. It is important that they are fitted in the correct position and this is achieved by drilling the front pair of holes 3<sup>1</sup>/<sub>2</sub>" apart and 2<sup>1</sup>/<sub>2</sub>" back from the front of the wing. With the wing correctly located drill down through the bracket and secure. The rear holes should also be drilled 3<sup>1</sup>/<sub>2</sub>" apart and positioned to line up with the rear bracket.

# Hand Brake Cable Installation - Drum Brakes

De Dion

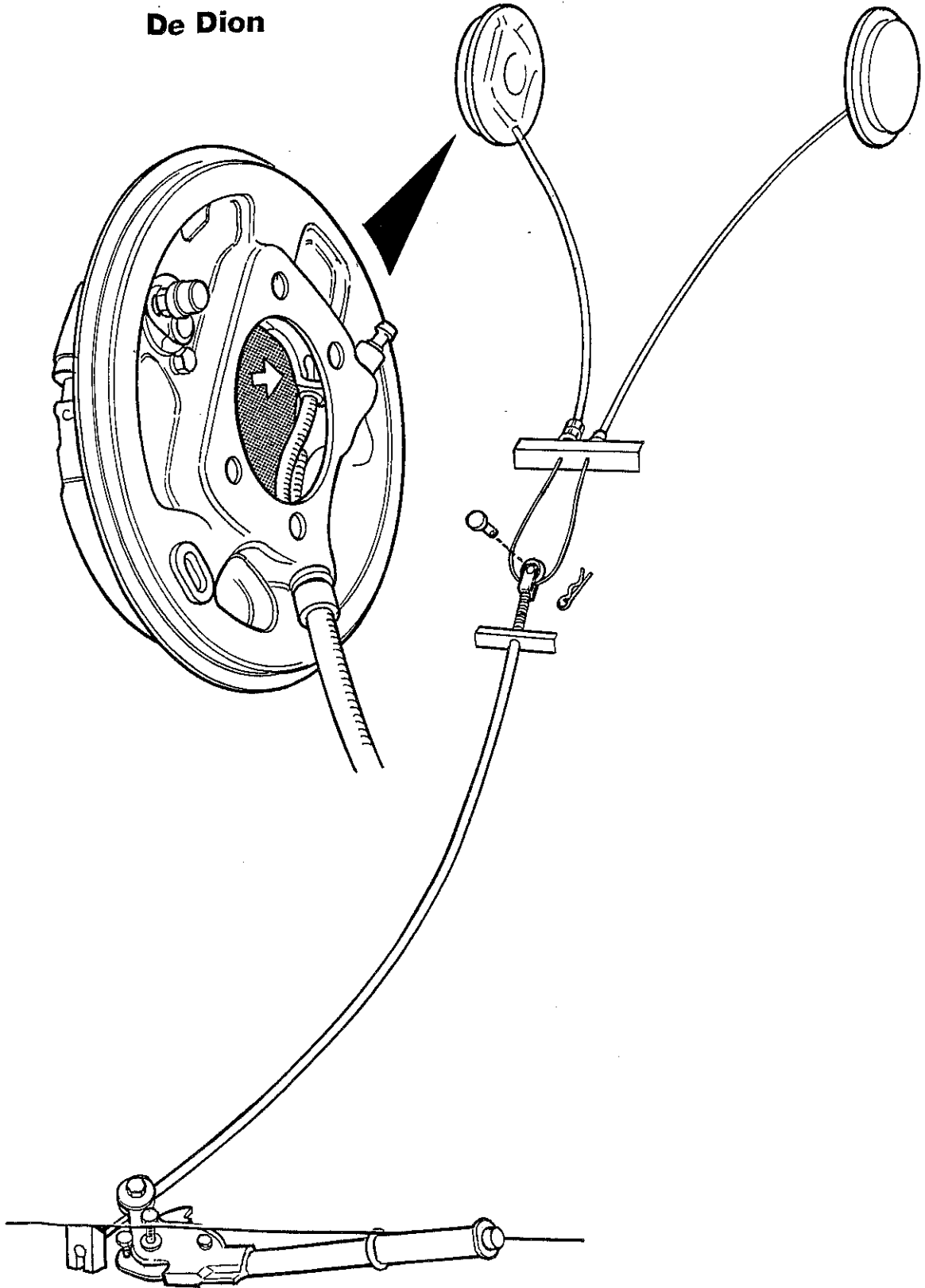


Fig 9.2.1

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

Although in the past we have not been able to supply engines to Kit car customers, the additional space gained by our move to Crayford has enabled us to produce a range of two engine kits, both based on the Ford 2265E Kent unit. Please refer to section 18 of this manual for specifications and assembly instructions.

Should you intend to fit an engine obtained elsewhere we are in a position to supply spare parts, ancillaries and brackets, nuts and bolts etc , including for example Weber DCOE carburettors, correctly jetted and modified for engines fitted to Sevens. We cannot as a rule undertake specialist machining work on non Caterham supplied engines.

We do supply current specification Sierra XR4i five-speed gearboxes with a full kit of items necessary to complete the installation including a special adaptor in order to fit this to the correct bellhousing for any of our optional engines. Unfortunately Escort Sport gearboxes are no longer available new and therefore not stocked by Caterham. Exchange units should however be available from Ford dealers, and all the minor items needed to complete the installation are held by us.

### 10.1. Assembly of Gearbox Kit - Five-Speed XR4i

1.1 The 5 Speed Gearbox kit includes all the items necessary to prepare the gearbox for installation in the Seven fitted with any of the recommended engines. It should be noted that several items relating to the gearbox are included in the miscellaneous

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

kit such as the speedometer cable, right-angled drive, gearlever, gearbox mounting and clutch cable.

1.2 The Bellhousing and adaptor should be bolted to the front of the gearbox casing using the four special 12mm x 60mm bolts, (metric fine thread) noting that the gasket should be fitted between the gearbox and the adaptor.

These bolts should be torqued to 35 lb ft and loctite should be used to ensure they do not work loose.

1.3 Fit the speedometer drive gear into the rear, nearside of the tailshaft housing and secure into place by gently tapping its locating plate into place with a soft hammer.

The small oil seal fits over the output spindle and should be gently pressed or tapped into place using a suitably sized socket as a drift. It is advisable to lightly lubricate or grease the moving parts before assembly.

1.4 Insert the square section drive pin into the spindle and slot the right angle drive gear over it and into the socket provided for it. Secure using the circlip and check to make sure this is fully home since re-doing this job with the gearbox in the car is very awkward. Attach the speedometer cable.

1.5 Screw the reversing light switch into place on the rear offside of the tailshaft housing.



## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

1.6 Gently tap the clutch arm pivot pin into the hole provided inside the nearside of the bellhousing capturing the nylon bush. Insert the clutch arm over the first motion shaft with its inner end clipped over the pin and its outer end protruding through the edge of the bellhousing to take the cable. Clip the clutch release bearing into place. Push the clutch cable bush into the hole provided for the clutch cable from the front.

1.7 The clutch cable is threaded through the cable bush in the bellhousing and then through the hole in the gaiter which is held in place by its clip.

1.8 Bolt the metal/rubber/metal gearbox mounting to the underside of the tailshaft housing using the 12mm x 25mm bolt and lockwasher.

### 10.2. Preparation of Gearbox - Four-Speed Escort Sport

2.1 An exchange gearbox is usually supplied without fittings and therefore the items listed below will need to be sourced and attached before it can be installed in a Seven. It may be necessary to partially grind away the lug underneath this gearbox to avoid contact with the chassis crossmember. (see figure 10.4.4)

- a) Reversing lamp switch
- b) Speedometer drive gear
- c) Speedometer drive oil seal

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

- d) Speedometer drive locating plate
- e) Clutch actuating arm
- f) Clutch release bearing
- g) Clutch cable bush
- h) Clutch cable/arm rubber gaiter and clip

All the above items are stocked by Caterham Cars.

2.2 The Miscellaneous kit provides the following:

Speedometer cable and circlip

Clutch cable

Gearbox mounting and necessary bolts

Gear lever, knob, gaiter etc.

Gearbox mounted shortened gear lever and remote linkage

2.3 Fit the gearbox mounting, speedometer drive and reverse gear switch as per five-speed, except that this gearbox does not need the right angle drive gear for its speedometer.

2.4 Similarly, fit the clutch arm and release bearing, though this gearbox does not need a separate clutch arm pivot pin.

2.5 Remove the blanking plate at the rear of the gearbox above the output shaft and carefully lever out the reverse gear stop taking care not to damage the threads into which the gearlever is screwed. Refit the blanking plate.

2.6 Screw the dummy (shortened) gear lever into place, assemble the remote shift links onto this (as below) leaving

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

connection to the second gear lever until the gearbox is installed in the car. (see diagram 10.2.6.)

Slip the drilled metal bush over the shortened gearlever and attach to it the two gearchange links, with the black plastic inserts clipped into their holes. Bolt together with steel washers on each side using the 3/16" x 1<sup>3</sup>/<sub>4</sub>" caphead bolts and nylocs provided. Assemble the rear, complete gear lever with spacing washers between the lever and the steel links in order to make the strips parallel.

### 10.3. Fitting Engine/Gearbox to Car - Five-Speed De Dion

3.1 It is possible to fit the gearbox into the car first and attach the engine afterwards but rather easier to bolt the engine and gearbox together first and insert them as a unit. This is because it can be difficult, due to tight tolerances in the engine bay, to align the clutch with the first motion shaft, whereas it is straightforward when out of the car. NB, Bolts into the bellhousing are metric, bolts into the engine are UNC.

3.2 When fitting the dust shield between the engine and gearbox, we advise that you take the precaution of welding up the existing split and cutting it into two separate upper and lower sections along a line roughly corresponding with the bottom of the cylinder block, but retaining the starter motor location on the upper half (see diagram 10.4.4).

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

Due to low ground clearance the chances are that the sump pan may be damaged at some time in the car's life and this simple modification allows the pan to be removed without separating the engine and gearbox in the car.

3.3 The engine can be fully kitted with ancillaries - eg. carburettor(s), fuel pump, oil pump and filter, starter etc, but the engine mounting brackets are best left unfitted until the engine/gearbox assembly is in position.

This is because the offside bracket will foul the steering column and there is a danger that due to the width of the engine when its mountings are attached, damage can be done to the aluminium body skin.

The engine mounting rubbers are attached to the chassis using four 5/16" x 1<sup>3</sup>/<sub>4</sub>" UNF bolts, washers and nylocs and for convenience these should be bolted in place before the engine is inserted. The gearbox mounting is held using two 5/16" x 1" UNF bolts, washers and nylocs.

Before fitting the gearbox into the car, remove the transmission tunnel top by removing the 4 screws holding it in position.

An engine crane or block and tackle will be needed to lift the engine gearbox assembly and accurately position it in the chassis, sliding the propshaft into the rear housing of the gearbox as you do so. A trolley jack under the gearbox will be very helpful.

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

It will probably be necessary to twist the propshaft in order to get the splines to align. Please note that the forward end of the propshaft is not supposed to go fully home into the gearbox.

Note also that the speedometer right angle drive is very vulnerable and a tight fit into the transmission tunnel.

3.4 If the engine hasn't already been fitted with ancillaries including clutch and accelerator cables then do so now.

Adjust the position of the clutch pedal to suit your individual preference (normally level with the brake pedal) by turning the adjusting screw on the cable end of the clutch pedal, locking in position with the nut when a satisfactory position is achieved.

The clutch cable is adjusted where it feeds into the bellhousing. The "bite" point should again be set according to personal preference but take care that it is not so adjusted as to prevent the clutch from fully engaging or disengaging.

Take care to ensure that the bolt and nyloc nut securing the clutch cable to the pedal is not fully tightened otherwise the stress put on the cable will lead to premature failure.

The speedometer cable should be mounted through the large grommet above the steering column in the front bulkhead and connected to the back of the speedometer. (Please see section 10.7 for electrical connections and 10.6 for the cooling system).

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

### 10.4. Fitting Engine/Gearbox to car - Four-Speed Live Axle

4.1 Attach the engine to the gearbox before fitting into the car. The propshaft must also be slid into the tailshaft housing at this point. You should also remove the transmission tunnel cover from inside the car, held by 4 screws.

4.2 Note our comments relating to the dust shield in 10.3.2 and do not fit the engine mountings to the cylinder block yet, as per item 10.3.3

4.3 Lower the engine/gearbox/propshaft assembly into the car, carefully feeding the propshaft through the transmission tunnel to the rear axle. Watch also that the dummy gear lever complete with links does not foul the underside of the bulkhead. When correctly positioned, attach the engine mountings and bolt the engine and gearbox to the chassis as specified in 10.3.3. A trolley jack under the gearbox will greatly assist with getting the complete assembly eased into position.

The propshaft is attached to the differential by four 3/8" x 1" UNF bolts and nylocs which should be tightened to 25 lb ft.

4.4 Attach the reverse gear stop to the chassis as shown in the diagram 10.4.4 and screw the remote lever into place. Check that all gears can be selected. It is necessary to push downwards for reverse

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

### 10.5. Fitting Engine/Gearbox to car - Four-Speed De Dion

5.1 Follow instructions as in section 10.3 except that the four-speed gearbox uses different mountings in the chassis to the five-speed. All the necessary additional components are included in the miscellaneous kit for this application including an extra aluminium tunnel cover to accommodate the remote linkage and the gearlever which is situated further back in the car than the five-speed.

5.2 Fit the additional crossmember into the chassis to take the gearbox mounting. The lower chassis rails within the transmission tunnel are already drilled for this purpose. This is secured with 4 5/16" x 1<sup>3</sup>/<sub>4</sub>" UNF bolts washers and nylocs.

5.3 The kit includes a special bracket assembly incorporating a turret needed to install the remote gearlever. Screw the lever loosely into the turret and attach also the reverse stop before fitting into the transmission tunnel. The bracket locates within the tunnel itself and should be positioned so that the centreline of the gearlever turret is directly over the centreline of the chassis crossmember immediately in front of the seats. Its top edge should touch the underside of the two tubes at the top of the tunnel and the two strengthening plates fit onto the outside of the tunnel with their upper holes positioned so that they can be rivetted directly to these tubes thus preventing the aluminium walls of the transmission tunnel from taking the strains imposed by gearchanging.

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

Secure this into place by drilling 6 3/16" holes each side as marked by the strengthening plates and rivetting with the 3/16" integral washer rivets provided, the lower 4 through the tunnel walls and the gearlever mounting bracket and the upper 2 into the tubes.

5.4 Fit the engine gearbox assembly into the car in the same way as detailed in 10.3 and assemble the gear linkage as in 10.4 Place the gearlever into neutral and centralise the new tunnel top around it. Locating existing riv-nuts in the tunnel carefully drill the new cover to fit using the 4 screws.

### 10.6. Cooling System Kit

#### 6.1 A. Pre May 1987 chassis

The electric cooling fan should be fitted first. This bolts into place using two 3/16" x 3/4" UNF bolts and nylocs onto the steering rack crossmember and is attached to the wiring loom using the matching connectors. The (yellow) fan itself is held onto the motor using the small spring clip.

#### 6.1 B. Post May 1987 chassis

The electric cooling fan assembly is fitted using three 6mm nyloc nuts screwed onto studs which form part of the motor. Check that the fan pulls air through the radiator rather than pushing it towards the radiator. Reverse connections if necessary.

6.2 The radiator (whether standard or increased capacity)



## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

attaches to the very front of the chassis by four rubber bobbins which are secured with 5/16" UNF nuts and lock washers. It does not matter which way up the radiator is fitted.

6.3 The Caterham cooling system uses a special thermostat housing/header tank arrangement which is supplied with this kit so the normal thermostat housing, if fitted, should be discarded. Drop the Caterham thermostat into place and position a greased or Hermetited gasket before bolting the housing into place using the two 5/16" x 1" UNC bolts and lockwashers.

The neck to which the top hose is attached should point forward and to the nearside. Do not overtighten the cooling fan switch unit in this housing.

6.4 The kit provides two rubber hoses for connecting the radiator to the engine as follows:

TOP HOSE: Radiator to thermostat housing

Ford 2265E OHV engine: Part No. 594-1

Cosworth BDR: Part No. 594-2

BOTTOM HOSE: Radiator to water pump

Ford 2265E OHV engine: Part No. 594-3

Cosworth BDR: Part No. 594-3

Both hoses should be a tight fit over the relevant inlet/outlet and the Jubilee clips used to secure the connections will probably need to be slackened before sliding into place.

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

All connections should be fully tightened and care will be needed to ensure that hoses are clear of the chassis, cooling fan and steering gear. Remember to retighten the Jubilee clips once the engine has been warmed to prevent leakage of coolant.

6.5 Finally the overflow bottle is attached to the lefthand side of the chassis within the cruciform bracing immediately above the steering rack. (see diagram 10.7)

The top chassis square tube is drilled and the bracket attached using the large pop rivets provided or self tapping screws. The overflow bottle is a tight fit in this space so accurate positioning of the bracket is important. The bottle cap should be drilled to take the overflow hose ( 1/2") the other end of which attaches to the thermostat housing. Secure the overflow hose to the top hose using ty-wraps.

### 10.7. Engine Compartment Wiring

The wiring loom provided is designed to be used with a Ford 2265E ohv engine with a pre-engaged starter and Bosch distributor. Caterham supplied Ignition Components comply with all statutory requirements as stipulated in EEC Regulation 10 and EEC Directive 72/245.

If your engine differs from this specification the notes provided under 10.7. will help but failing this, contact

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

Caterham Cars or an automotive electrician. Before going further, the battery MUST be disconnected. (refer to diagram 10.7 and the wiring diagram at the rear of this manual)

### 7.1 Alternator

The alternator is connected using the thick brown wires attached to two large spade terminals and a single brown/yellow wire. It does not matter which way round the large spades are connected. The brown/black wire should be connected to the B+ terminal on the alternator. If this terminal is not present (earlier alternators) this wire should be cut at its exit point from the loom taking care to insulate any bare wire.

Note that these wires are close to the exhaust manifold and we therefore recommend that the loom is routed down the diagonal and under the engine mounting to the starter and held in position using ty-wraps.

### 7.2 Pre-engaged Starter

The red battery lead is connected to the main bolt on (15mm) terminal.

The small white/red wire is connected to the spade terminal immediately underneath this. Do not disturb the solenoid to starter connecting wire.

### 7.3 Temperature Sensor

This is fitted to the cylinder head on the lefthand side, immediately below the thermostat housing. The sensor provided

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

in the kit must be used since this is compatible with the car's VDO temperature gauge. Connect using the Green/Blue wire which fits sideways onto the end button of the sensor trimming its insulating sleeve as necessary.

### 7.4 Electric Fan Switch

This is connected using the black/green and purple wires. It does not matter which way round these are fitted.

### 7.5 Oil Pressure Switch

The Seven is wired to use a VDO electric oil pressure gauge and the correct sensor is provided in the miscellaneous kit. Fit this to the cylinder block on the offside above the oil filter housing. Connect this with the black wire which is secured to the switch with the nut provided.

### 7.6 Distributor

If Lucas transistorised ignition is fitted, the wiring for this is included within the loom and the three pin connector will fit to its equivalent on the distributor. If it is not, the low tension lead connects to the white/black wire on the loom.

### 7.7 Engine Earth

The engine is earthed from its righthand side top bellhousing bolt to the adjacent bolt securing the three way brake union to the chassis using the strap provided.

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

### 7.8 Live Battery Connection

Immediately above the battery, a thick brown wire and a thin brown/black wire each terminating in an 8mm eyelet emerge from the loom. These connect to the live (+) battery terminal by the clamping bolt attaching the red lead which runs from the battery to the starter. It will be necessary to snip the red terminal cover to incorporate these wires.

This red cable is routed from the battery down to the bottom chassis tube, rearwards around the gearbox crossmember and forward again along the opposite bottom chassis tube to the starter. Secure in place with tywraps.

### 7.9 Alternate Specifications

#### a) CENTRIFUGAL STARTER

In order to use one of these (common on older engines), a separate starter solenoid will need to be fitted adjacent to the starter linked together with a suitable thick cable. The red battery lead and brown lead from the alternator should be attached to the opposite terminal to that connected to the starter, with the red and white wire attaching to a suitable spade terminal. This assumes a Lucas type solenoid is used. If not, we suggest you consult an automotive electrician.

This is not a recommended fitment especially for engines with high compression ratios. It should be noted that the ring gear on the flywheel differs according to whether a centrifugal or pre-engaged starter is fitted, these are not compatible.

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

### b) BDR / BDA ENGINES

The cooling fan switch position is changed and a small extension loom is available from Caterham. Similarly, the temperature sender wire will be too short and an extension is available.

### 7.10 Final Connection

Only when all other contacts are made should the battery be connected remembering to attach its live (+) terminal first. The earth terminal is connected to the engine mounting.

## 10.8. Exhaust System

8.1 The exhaust kit includes a full stainless steel exhaust system for the car which you have specified. There may be variations in specification, but all exhausts exit the engine bay at the lefthand side and run along the side of the car, under the rear axle, to the rear. (If a BDR or competition system has been specified see options)

We recommend the use of Holts Firegum or similar to seal the joints between the sections and this should be used fairly liberally during fitting to prevent 'blowing'.

8.2 Attach the exhaust manifold, which is in two pieces, to the engine using suitable gaskets and 5/16" UNC bolts.

8.3 Slide two small exhaust clamps over the bottom of the pipes and slide on the 'Y' piece which turns the system through

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

the hole in the body side.

8.4 Bolt the small metal bracket to the lower nearside of the car immediately in front of the rear wheel arch using the 1" x 5/16" bolt taking care that the threaded bush is clear. The aluminium panelling may need to be relieved slightly in order to reveal the threaded bush on the chassis. The bracket when fitted should point downwards with its longer side outwards.

Attach the rubber bobbin to the top of this and tighten using a 5/16" UNF nut and lockwasher.

8.5 The main silencer is supported on this bracket and slides onto the 'Y' piece where it is secured with one of the larger clamps. The rear bracket attaches to the bobbin using a 5/16" nut and lockwasher. NB. The silencer bracket sits on top of the rubber bobbin mounted on the exhaust bracket.

8.6 Fit a further exhaust clamp over the pipe emerging from the back of the silencer and slide on the tailpipe. This should be adjusted by twisting so as to ensure it does not foul the underside of the chassis or the inside face of the rear tyre

8.7 The rear exhaust strap hangs from the bracket protruding from the chassis immediately behind the axle and this should be drilled to suit a 5/16" bolt and nyloc.

The top of the strap is secured to this bracket and the bottom should be hooked by a jubilee clip around the tailpipe.

## INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

8.8 Finally the aluminium exhaust guard can be fitted after sliding the long jubilee clips through the channels provided in its underside. This is positioned to protect the passenger from inadvertently touching the hot silencer although care should be taken to ensure that it does not touch the bodywork.

8.9 Before the exhaust clamps are fully tightened, we suggest that you check carefully the alignment of the system to ensure that it neither lays too low, nor contacts the bodywork or the inside of the left hand rear tyre at any point.



# CROSS-SECTION THROUGH TWO MODIFIED GEAR LEVERS

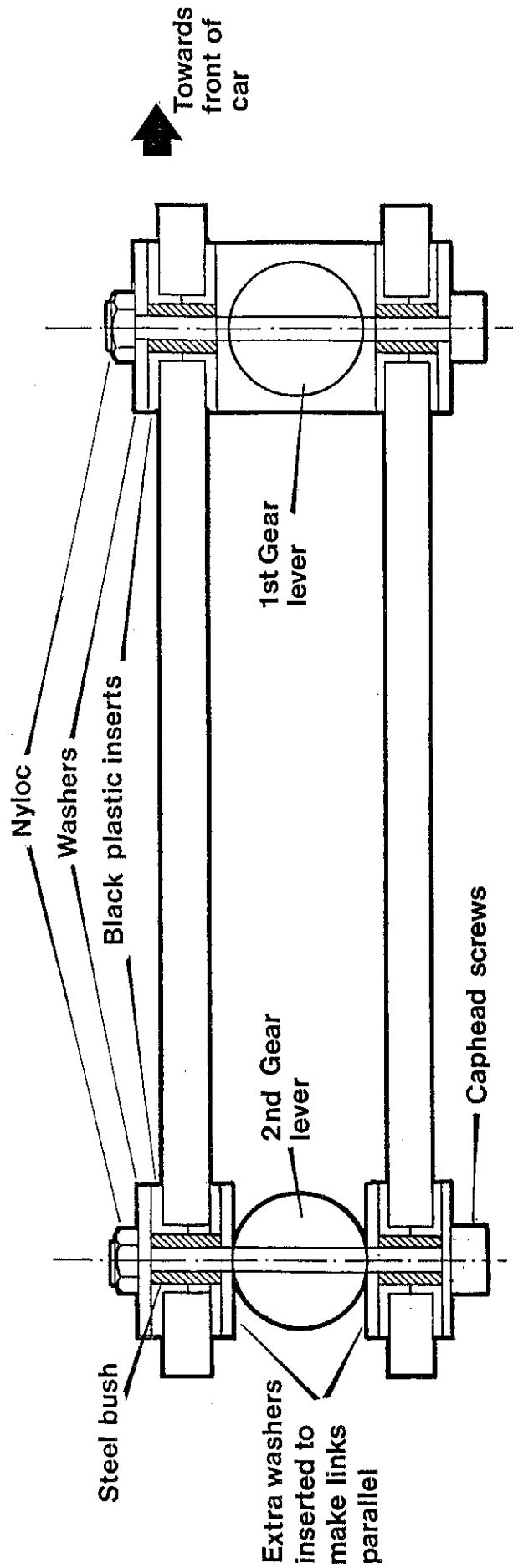


Fig. 10.2.6

# Wiring Connections Under Bonnet

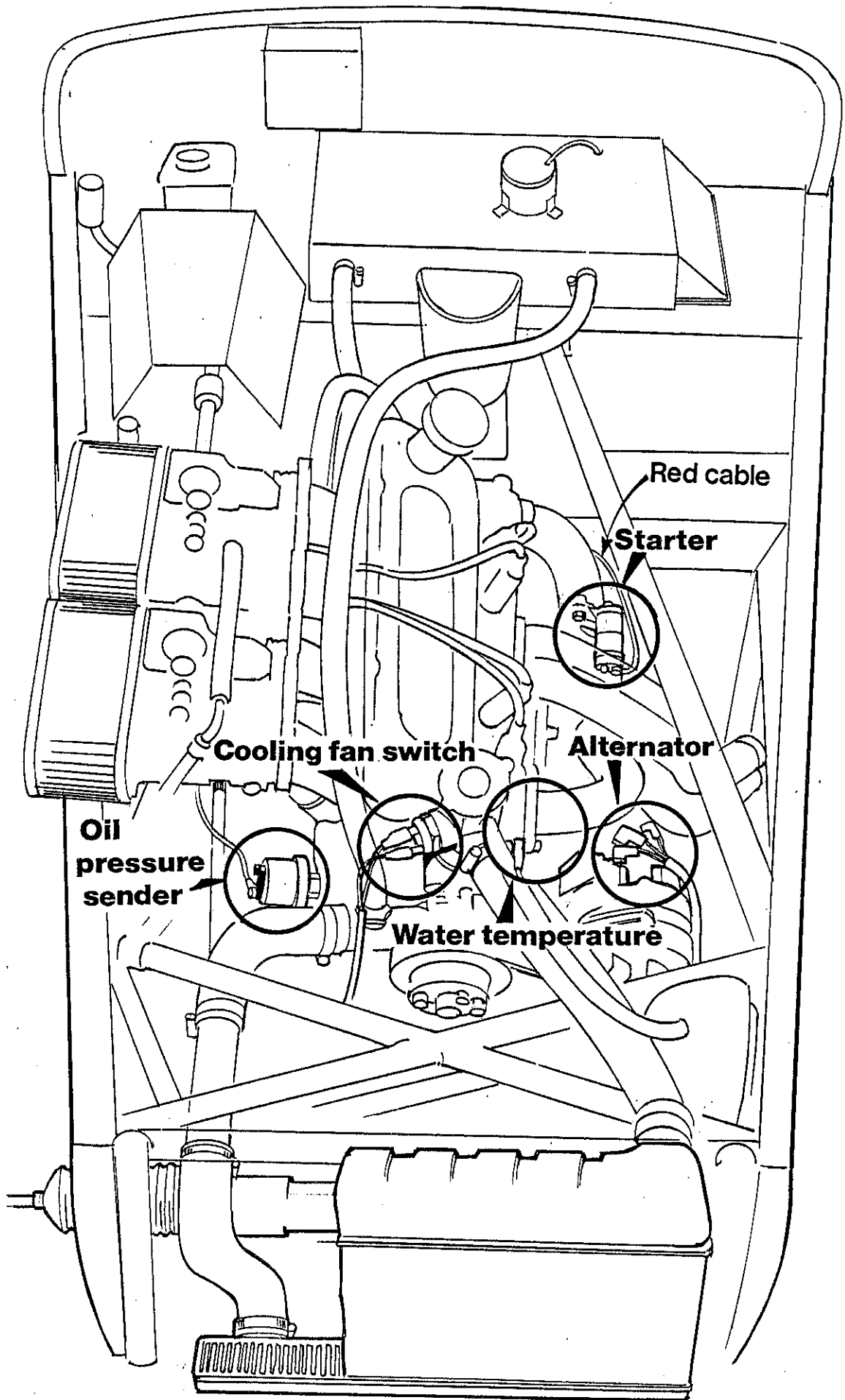


Fig. 10.7

## ATTACHMENT OF LIGHTING KIT

The lighting kit includes all the parts needed to make the Seven comply with lighting requirements under United Kingdom Construction and Use regulations. If the instructions in this section are followed, all legal requirements will be fulfilled.

If alternative parts are used they must be 'E' marked and fitted in accordance with diagram 11.1 or your vehicle will not comply with Construction and Use regulations. (See also wiring diagram at rear)

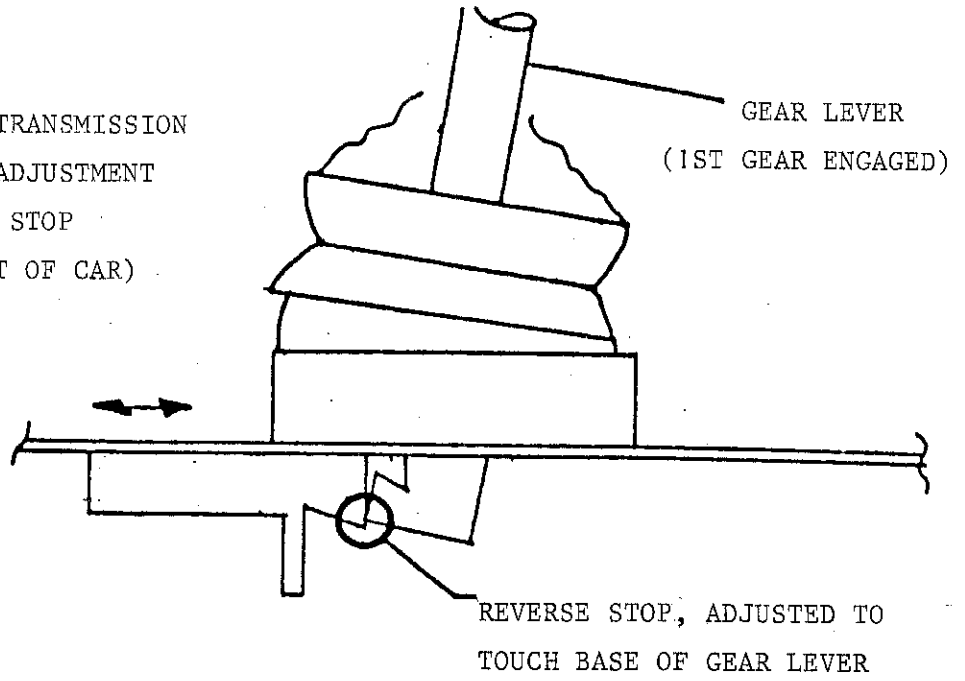
### 11.1. Rear Lights

1.1 The kit includes two identical rear light assemblies which comprise rear, brake and indicator lights. They are mounted on rubber blocks which ensure that the lights are vertical when fitted. These units can be turned around on the blocks to enable the amber indicator lights to be on the outside.

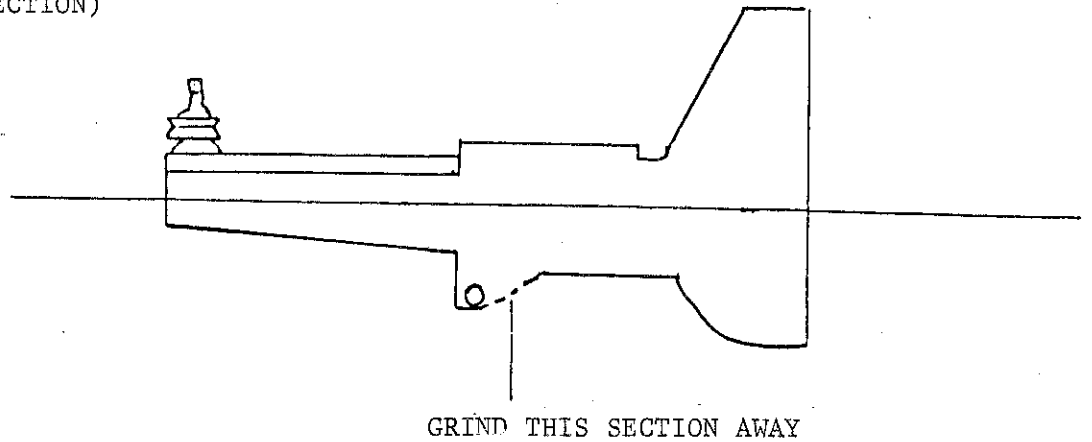
1.2 The rear wings are marked with two dots which give the position for the rear lights. Drill the lower innermost hole to 4mm and the outer mark 5mm to take the wiring.

1.3 Remove the lenses from the rear lamps along with the bulbs noting that the indicators use a single filament and the rear/brake lights a double filament bulb. You will see that there are four square holes in the metal base plate which tie in with dimples in the rubber block. Drill these through the rubber with a 4mm drill ensuring this is at 90° to the base plate.

SECTION ACROSS TRANSMISSION  
TUNNEL TO SHOW ADJUSTMENT  
OF REVERSE GEAR STOP  
(VIEW FROM FRONT OF CAR)



ESCORT SPORT GEARBOX  
(CROSS SECTION)



ENGINE TO BELLHOUSING SANDWICH PLATE  
SHOWING CUTTING POINTS FOR EASY SUMP REMOVAL

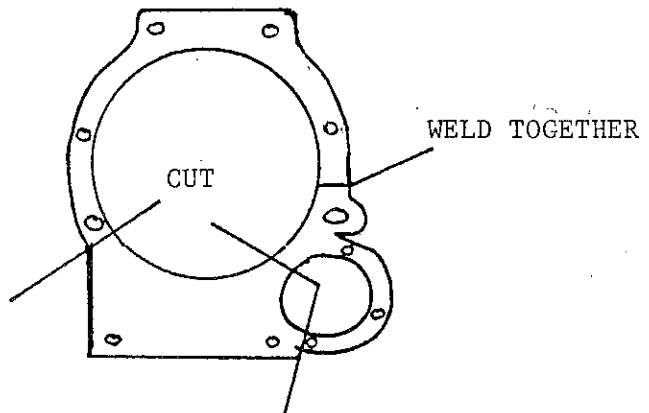


Fig. 10.4.4

## ATTACHMENT OF LIGHTING KIT

1.4 Each rear light unit is attached using four long self tapping screws, the upper ones being longer. Feed the wiring through the 5mm hole you have drilled and attach the rear light with one of the shorter screws at its bottom inside corner. Adjust for levelness and drill through into the wing using the 4mm drill for the remaining three holes. We suggest that you remove the unit and clear away the swarf before finally fixing in place. Replace the bulbs and lenses.

1.5 The wiring is connected to the main loom using 'bullet' connectors into insulated sleeves provided with the kit. Fit the sleeves onto the exposed bullets on the loom checking that they have been pushed fully home. A fine nosed pair of pliers may be useful here. Feed the wires from the light unit through the grommet under the wheel arch and connect to the loom as follows:-

	Left side Unit	Loom	Right side Unit
Rear light	red	red/white	red
Brake	green/mauve	green/mauve	green/mauve
Indicator	green	green/red	
Indicator		green/white	green
Earth	black	black	black

1.6 For neatness, bind the wires from the light unit together with insulation tape and clip them out of harm's way with a tywrap to a block screwed onto one of the protruding ends of the light mounting self tappers.

## ATTACHMENT OF LIGHTING KIT

### 11.2. Reversing Lights

2.1 The reversing lights are fixed to the rear wings below and slightly inboard of the rear light units. The builder has flexibility with their exact location, but we suggest that the bottoms of the reversing lights are 1" above the bottom of the wings, and the inner edge 2" outboard from the beading at the inner edge of the wing.

2.2 Dismantle the reversing light unit, removing the lens and bulb and reveal two holes in its metal base.

Having established the correct positioning on the wing, mark and drill two 5mm holes for the fixing bolts and a further hole large enough to take the live wire connection.

2.3 You will, no doubt, have noticed by now that the reversing light is provided with a spade connector whereas the loom uses bullet connectors.

In order to establish a connection a bullet connector should be fitted to the green/brown wire from the reversing light.

2.4 The reversing lights are bolted to the rear wings using

## ATTACHMENT OF LIGHTING KIT

two 5mm x 16mm screws and nylocs noting that the green/brown earth lead fitted with an eyelet connector should be fed through the grommet from the car and secured to the reversing light by one of these.

2.5 Replace the bulb and lens, taking care not to overtighten the lens retaining clips which may crack.

### 11.3. Rear Fog Lights

3.1 The twin rear fog lights are attached to the back panel of the car and again the exact positioning is down to the builder. We suggest they are fitted with their bottom edges 1" up from the bottom of the back panel and with their inner edges  $2\frac{1}{2}$ " outboard of the outer edge of the spare wheel carrier. It is wise to check their position relative to your spare wheel prior to fitment, especially if oversize wheels are being used.

3.2 Having established your chosen positioning, drill two 5mm clearance holes for their locating studs and a central 9/16" hole for the main body of the light. Bolt in place using large plain washers to prevent distortion of the back panel and 5mm nyloc nuts.

3.3 The live red/yellow leads are connected using 'bullet' connectors to the red/orange wires from the main loom on each side. The plastic loom protection should be stripped back to allow the black earth wire to be shortened and doubled back onto one of the fixing screws.

## ATTACHMENT OF LIGHTING KIT

### 11.4. Rear Number Plate Lamp

4.1 Dismantle the lamp unit and secure onto the spare wheel carrier using the two studs with 5/16" AF nuts and lockwashers.

4.2 Feed the red wire through from the loom into the back of the unit and clip the bullet into the live socket provided in the centre of the light unit. The number plate light is earthed through its base so no connection is needed.

### 11.5. Front Indicator Repeaters (Flared wings only)

5.1 These are attached to the outer edges of the front wings where dimples in the glass fibre clearly indicate their location.

5.2 Dismantle the repeater assemblies removing bulb and lens. Drill through the front wings at the marked points with a 5mm drill for the outer holes and a 9/16" drill for the centre.

5.3 Remove the studs from the unit and bolt the repeaters into place using 5mm x 16mm Posidrive screws and nylocs. Attach the black earthwire to one of the mounting screws, enlarging the tag hole to suit, in the process and replace the bulb and lens.

5.4 The repeaters are wired in with the main front indicators - see section 11.7.

### 11.6. Headlights

6.1 The headlamp bowls are mounted upon brackets which are



## ATTACHMENT OF LIGHTING KIT

part of the upper front wing stays. The front indicator mountings (flasher brackets) also attach at the same point and are secured in place by the nut holding the bowl assemblies. (Cycle wing cars have separate headlamp/indicator brackets)

6.2 Mount the headlamp bowl on top of the front wing support with its cast base above the bracket. Fit the indicator mounting over the protruding thread of the headlamp bowl and secure into place underneath the wing support with the large 15/16" AF nut and lockwasher.

Tighten until the headlamp bowl can move but does not flop about. Note that the flasher brackets are handed and that the indicator itself mounts in front of the bracket.

6.3 The wiring for both headlight and indicator is part of the main wiring loom which should be fed through rubber grommets provided in the outer skin of the chassis.

The head and sidelight wiring should be fed upward through the hollow headlamp bowl mounting into the headlamp itself. The metal clamp and screw are not necessary.

6.4 The headlamp wiring can now be clipped into place within the plastic three point plugs provided as follows, viewed from the front:



## ATTACHMENT OF LIGHTING KIT

6.5 The sidelight bulb holder connects to the loom using bullet connectors red to red and black to black.

6.6 The headlamp itself is attached to the chrome plated rings at the front of the headlamp bowls. Remove these rings by undoing the top screws noting how these retain a U shaped small bracket. These screws are only undone sufficiently to allow the ring to clip off.

Noting which way up these rings fit, attach the headlight unit to the inside of the rings using three wire spring clips. These spring clips are a tight fit and may need easing slightly before they can be stretched into position. Note also that they can apparently be fitted either way up. Ensure that they are fitted TOWARDS THE OUTSIDE OF THE RINGS since otherwise they will prevent the ring/headlamp unit fitting into the bowl.

6.7 Connect the main headlamp wiring plugs and clip the sidelights into the back of the headlights. Hook the bottom of the ring into the lip on the headlamp bowl and swing the ring/light assembly up into position, securing with the top screws. Check that the headlights are the correct way up in their mountings, the word LUCAS where applicable should be horizontal. Final alignment should be carried out using a headlight beam aligning device which all garages should have.

## ATTACHMENT OF LIGHTING KIT

### 11.7. Front Indicators

7.1 The indicator units are fitted with rubber insulator/protectors which must first be removed. At the back of these protectors are the holes through which the wiring is fed and these will need to be opened up.

7.2 Fit the rubber protectors onto the mounting brackets and feed the wiring through from behind. There will be four wires to be connected: green/red LH (or green/white RH) and black from the loom and green and black from the repeater. Connect the black earth wires and the remaining pair of wires together.

7.3 There are several ways of connecting the relevant wires together including soldering or crimping into suitable 'bullets' but probably the easiest method uses the small connectors provided with the indicator units themselves.

Remove the existing connectors and strip the bare wires back about 1/4". Feed paired wires into the female end of the connector until the bared wires emerge from the other end at which point they are bent back. These can now be pushed into place on the indicator unit noting that the live connector attaches to the rear end and the earth connector to the side.

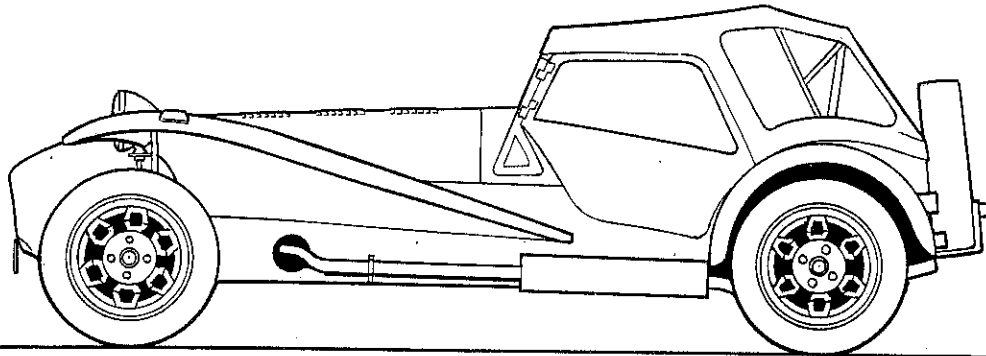
7.4 With the wiring attached the indicator unit is slid back into its protective sleeve and secured to the bracket with 3/16" nyloc nuts.

## ATTACHMENT OF LIGHTING KIT

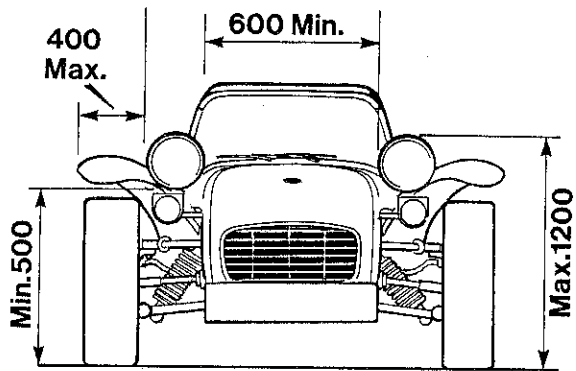
### 11.8. Final Testing

When all connections are made to the engine and the battery is installed, all the electrical functions can be checked. If there are any problems, recheck your connections and check that the bulbs have not been damaged in transit. In the unlikely event that problems persist, either contact Caterham Cars or an automotive electrician.

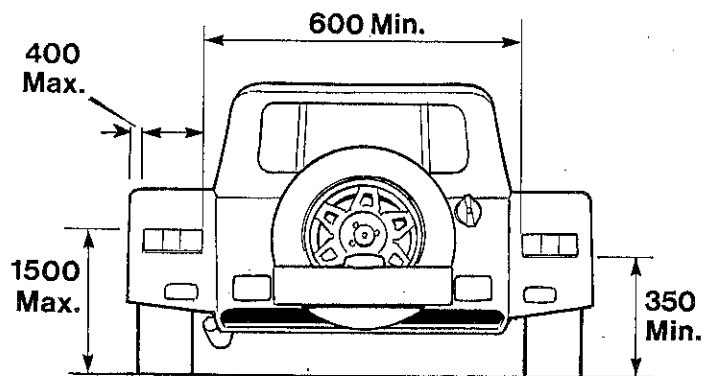
## Lighting - Legal Requirements



Position of Headlamps



Position of Rear Lamps



Dimensions in millimetres unless otherwise stated

	<i>Min. height</i>	<i>Max. height</i>
Fog Lamps	250	1000
Direction Indicators	430	2290

Fig 11.1

## INSTALLATION OF INTERIOR KIT

This kit provides the seats, carpeting and boot floor which is fitted in conjunction with the petrol filler (see miscellaneous section 9.4.4).

### 12.1. Boot Floor

1.1 This consists of a pre cut piece of plywood sheet. Although not strictly necessary, it can be protected with a suitable exterior or marine varnish before being fitted.

1.2 When in position above the fuel tank the floor is supported by the aluminium floor section at the front of the luggage compartment and the horizontal 'U' section at the back of the chassis. Drill through both the floor and its supports with a 1/8" drill and secure with self tapping screws.

1.3 The fuel filler pipe can now be fitted noting that the lower Jubilee clip is tightened from the right hand wheel arch.

1.4 The boot carpet is laid in place but will need to be cut where it fits around the fuel filler.

### 12.2. Carpeting

2.1 The footwell carpets are secured using three poppers at the rear of the footwell. Mark and drill three holes, evenly spread each side, approximately 1" in front of the cross member and secure the popper bases with either pop rivets or self

## INSTALLATION OF INTERIOR KIT

tapping screws.

2.2 Stick masking tape onto the underside of the carpet approximately where the popper bases are and lay in place, pressing firmly so that the bases make an impression on the tape. Use the rivetting tool and punch provided (instructions included in the pack) to make appropriate holes in the carpet and to rivet together the popper and its retaining cap.

2.3 If adjustable seats are to be fitted, a rear bulkhead carpet will be needed.

This has a leatherette strip along its upper edge which is glued (Evostick is suitable) to the top of the crossmember behind the seats. The bottom edge is secured by two poppers each side, the bases of which are riveted or screwed to the bulkhead.

We suggest you use the masking tape technique again to locate the correct points on the carpet.

On the De Dion cars in particular, the shape of the plate covering the joint between transmission tunnel and bulkhead prevents the carpet from lying flat. Alleviate this by making short inward cuts so that tabs of carpet can hinge out against the tunnel. These will be covered by the tunnel carpet.

2.4 Before fitting the transmission tunnel carpet it will be necessary to fit the gearlever gaiter. This is secured in all

## INSTALLATION OF INTERIOR KIT

models to the removable aluminium panel on the transmission tunnel and appropriate holes should be drilled with a 1/8" drill and held with self tapping screws. To fit this in the ideal place, try the gear lever in all positions before marking, so as to prevent it fouling the aluminium gaiter retainer.

Once the gaiter is in position, the gearlever knob and extension piece can be fitted. To fit the gearlever extension (De Dion cars only), we suggest that you first protect it with tape and then use Mole Grips to tighten it properly onto the existing lever. A little loctite will prevent it subsequently coming loose.

Remember on De Dion cars to fit the rubber plug into the speedometer drive access hole.

2.5 The transmission tunnel carpet is held in place once again mainly with poppers. We suggest that you employ three each side spaced along the bottom of the tunnel, ensuring that this carpet is pulled firmly down in place and locates correctly in front of the gearlever and against the rear bulkhead.

With live axle cars in particular, great care should be taken when drilling holes into the transmission tunnel not drill through brake pipes or wiring routed through it.

Where this carpet extends forward into the footwells, we normally glue it in position using a glue such as Dunlop L107



## INSTALLATION OF INTERIOR KIT

since Evostick is rather too powerful and may damage the carpet if it needs to be unstuck for cleaning or maintenance.

Alternatively, we suggest that you stick a VELCRO pad to the transmission tunnel and glue or sew its opposite half to the carpet.

2.6 Finally, the carpets that fit under the seats in adjustable seat versions can be laid in place. There is no need to retain these with poppers since the seat runners prevent them from moving once fitted.

### 12.3. Seating

3.1 Before the seats can be fitted it will be necessary to fit seat belts. Lap and diagonal belts (non-inertia) are available from Caterham Cars which have been made specifically for the Seven so that their mountings and webbing lengths are correct.

These use the mounting points provided in the chassis which comply with all EEC legal requirements, the stalks being fitted to the tunnel and the upper mounting including buckle retaining clip being fitted to the mounting adjacent to the rear spring/damper mountings.

Optional four-point full harness belts use the top mountings provided on the crossmember and share the same lower mountings.

3.2 Non adjustable seats are simply laid in place being

## INSTALLATION OF INTERIOR KIT

secured by their own weight and that of the occupants.

3.3 Adjustable seats (not available for short cockpit cars), whether of leather or cloth, are bolted in place using caphead bolts, plain washers and nyloc nuts. Firstly, it will be necessary to drill down through both the crossmember in front of the seats and the brackets at the rear so that the seat runners can be bolted through the aluminium floor using a 1/4" drill.

Lay the seats which are already attached to their runners in place and bolt down through their mountings using a plain washer below the bolt head and above the nyloc nut. The longer (6mm x50mm) bolts are used on the crossmember.

On De Dion cars 4 aluminium spacers are supplied which should be inserted between the rear fixing lugs and the floorpan to prevent distortion on tightening.

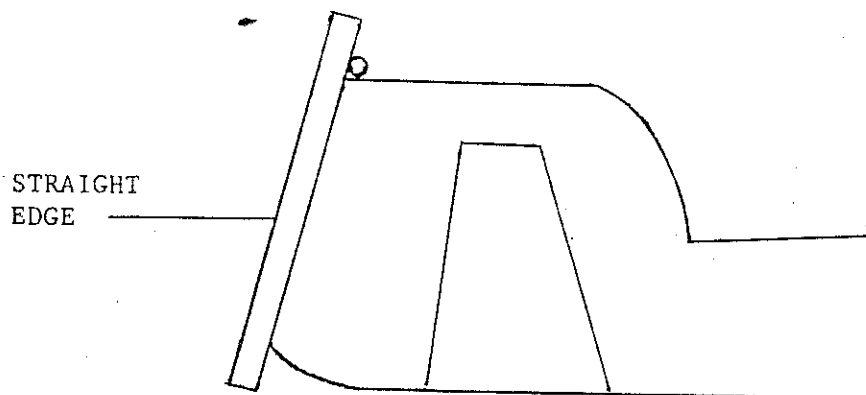
## ATTACHMENT OF WEATHER EQUIPMENT KIT

### 13.1. Fitting and Aligning Hoodsticks

1.1 The rear of the vehicle is marked with the locations of the popper bases necessary to secure the hood. These should be drilled with a 5/32" drill and the popper bases secured with 5/32" countersunk pop rivets.

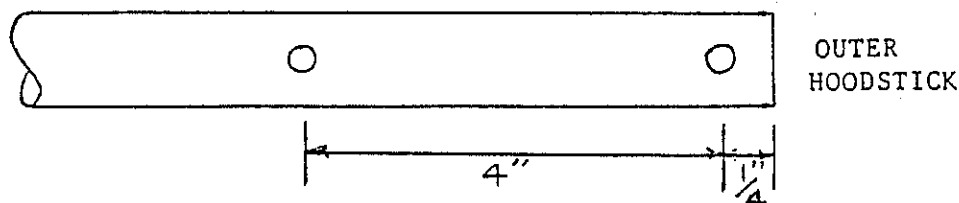
To prevent the drill from wandering off course we suggest that the hole centres are indented using a centre punch. (Failing this, a Phillips screwdriver may suffice).

1.2 The outer hoodstick should now be drilled for fitting. Referring to the diagram, position a straight edge up the back panel of the vehicle and lay the longer outer stick in place on the top of the car, noting how the kink should be uppermost, with its rear touching the straight edge. Mark the hoodsticks where they align with the mounting brackets on the chassis and drill through with a 3/16" drill. Care should be taken to drill these holes squarely across the tube.

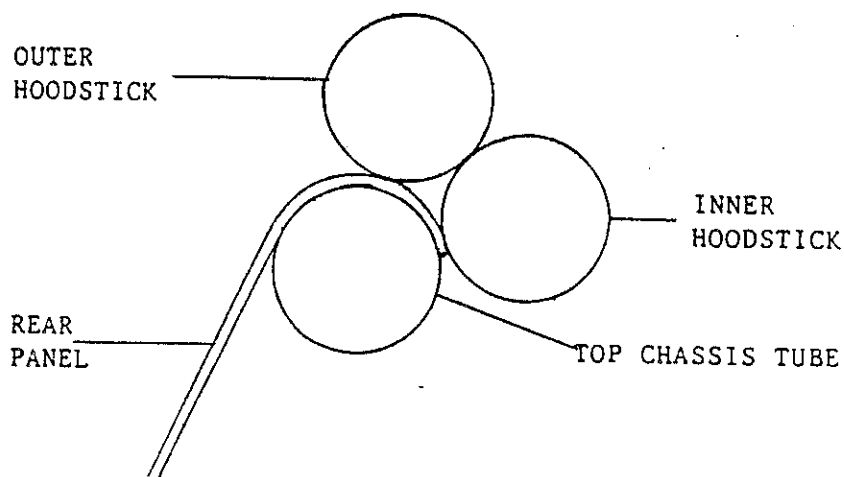


## ATTACHMENT OF WEATHER EQUIPMENT KIT

1.3 Mark and drill two more 3/16" holes, four inches from the first holes in order to attach the inner hoodstick and trim the outer stick to within 1/4" of the first holes.



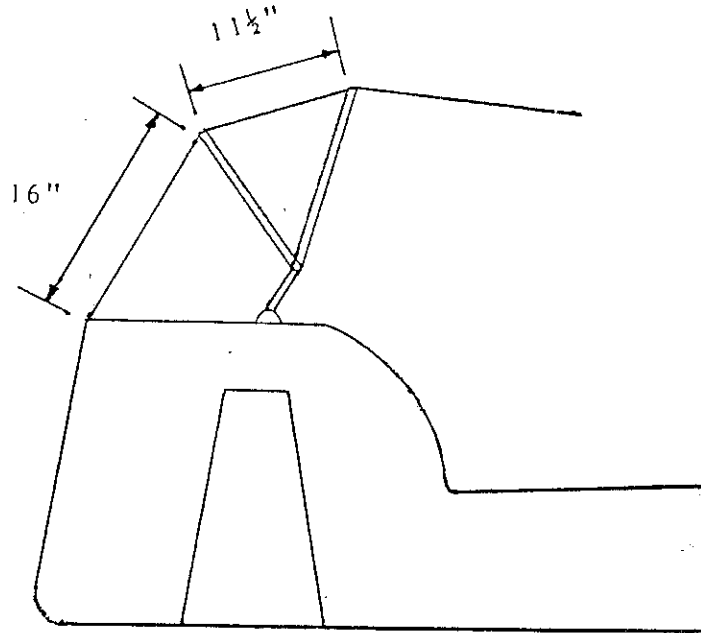
1.4 Bolt the outer stick in place using 5mm x 25mm Posidrive screws, washers and nylocs and offer up the inner hoodstick as shown on the diagram. Mark and drill the inner hoodstick with 3/16" holes aligned with those already drilled in the outer hoodstick. Bolt together with 5mm x 40mm Posidrive screws, washers and nylocs and tighten sufficiently to allow movement.



1.5 Feed the hoodstraps over the inner and outer hoodsticks and adjust so that they take up the positions as shown in the diagram. Since the exact positioning will depend upon the hood

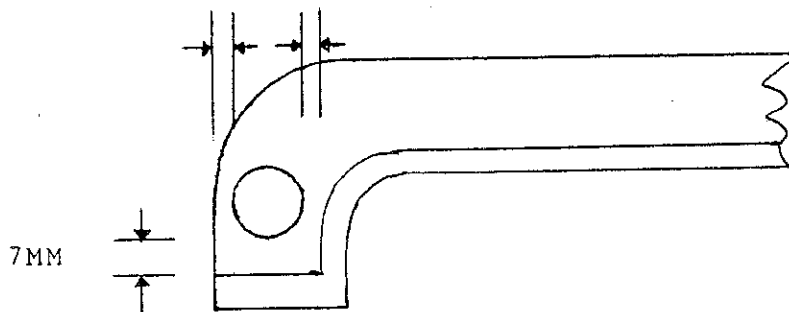
## ATTACHMENT OF WEATHER EQUIPMENT KIT

itself when fitted, temporarily secure the inner hoodstick to the rear of the car with string to maintain the 16" spacing as shown. (See section 13.3)



### 13.2. Hood Fitting

2.1 Starting at the front of the hood, fix two poppers to the outer edges in the positions shown in the diagram. Clip these in place onto the popper bases already fixed to the screen making sure that the weather seal strip is between the hood and the screen.

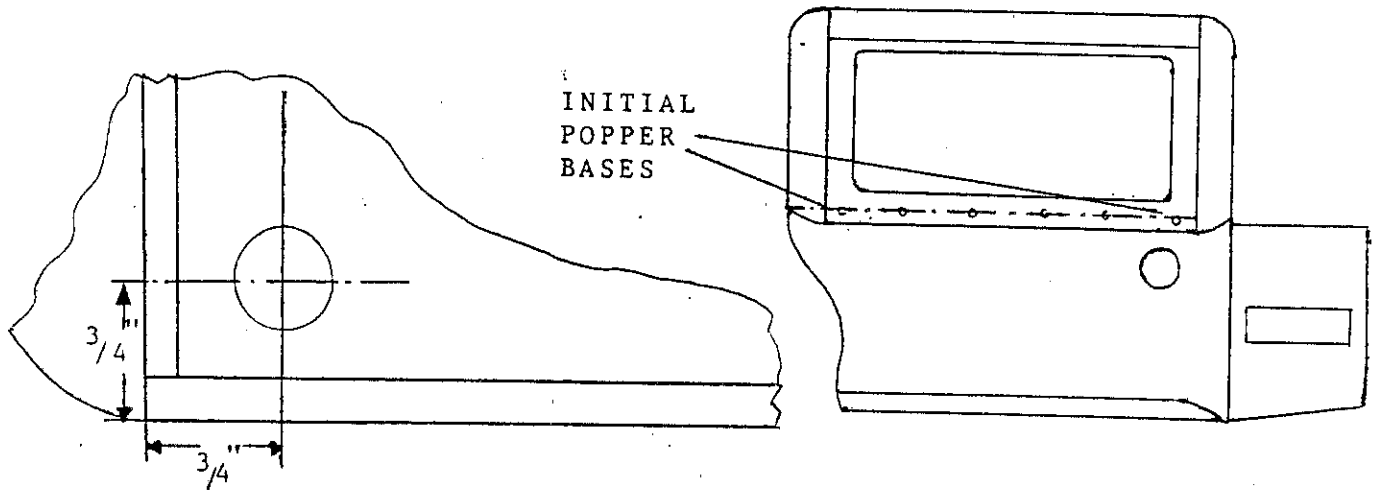


## ATTACHMENT OF WEATHER EQUIPMENT KIT

2.2 Mark out the remaining popper positions and fit the other five poppers to the hood and clip onto the screen.

2.3 Attach two poppers to the rearmost panel of the hood, as shown on the diagram,  $\frac{3}{4}$ " above the lower edge and  $\frac{3}{4}$ " in from the outside of the seam.

2.4 Mark out the remaining poppers on this panel and fit them  $\frac{3}{4}$ " above the lower edge. Clip the rear section in position.



L/H REAR CORNER OF HOOD

2.5 The hoodsticks are designed to align with the seams in the hood so adjust using the straps and string, noting carefully the dimensions achieved.

2.6 Attach the remaining poppers to the hood relative to the popper bases on the sides of the car taking care to stretch and tension the hood.

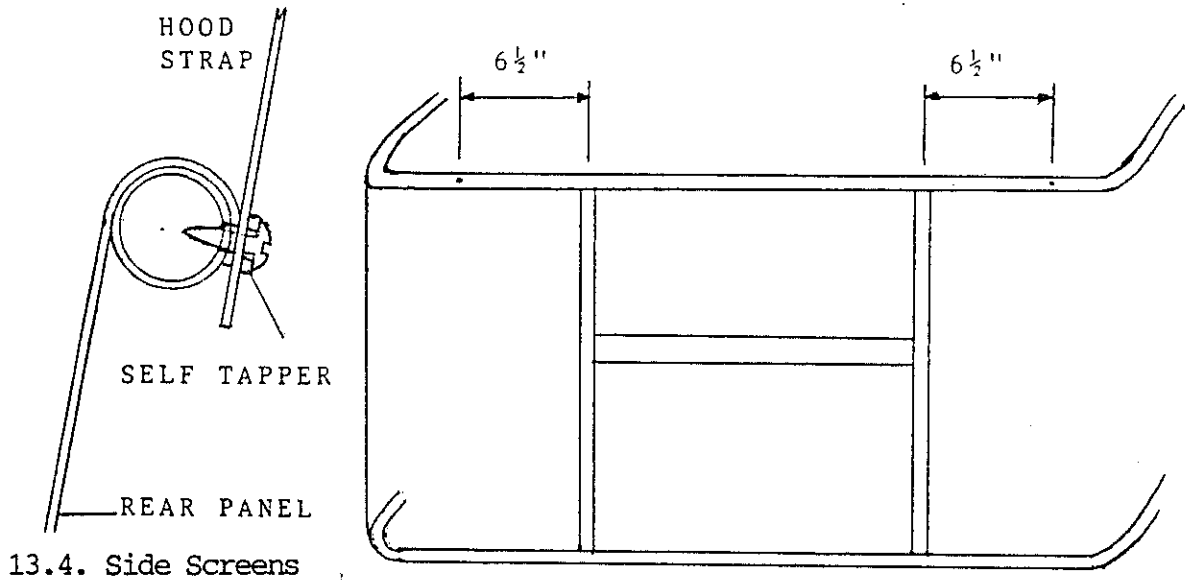
### 13.3. Hoodstick Adjustment

3.1 Noting the dimensions in 13.2.5 fix the hoodsticks into position. Drill the inner edge of the top rear tube with two

## ATTACHMENT OF WEATHER EQUIPMENT KIT

1/8" holes, 6<sup>1</sup>/<sub>2</sub>" outboard of the vertical braces as shown.

3.2 Make corresponding holes in the hoodstraps to achieve the correct dimensions and attach them using self tapping screws and plain washers.



### 13.4. Side Screens

4.1 Attach the side screen hinges to the outside of the windscreen with 5mm x 16mm bolts and nylocs.

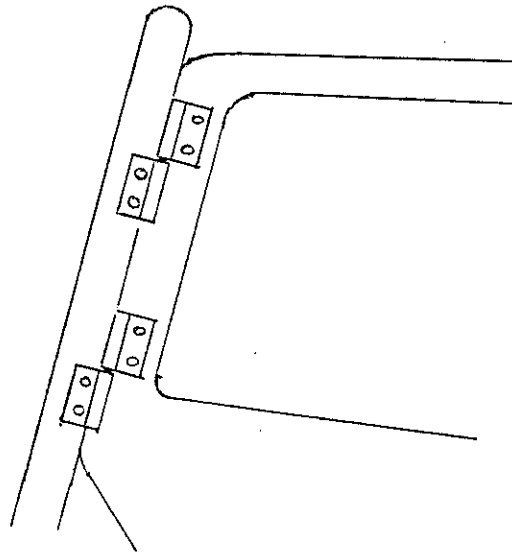
4.2 With the hood erected and tensioned, offer up the sidescreens into position. The top of the sidescreen should align with the hood guttering and the front tucks in behind the windscreen support to provide protection from the elements.

Position the other halves of the hinges above those fitted to the screen and temporarily insert the brass hinge pins. Mark the locations of the hinge mounting holes on the outside of the sidescreens and drill 3/16" holes through the metal frame within the screen.

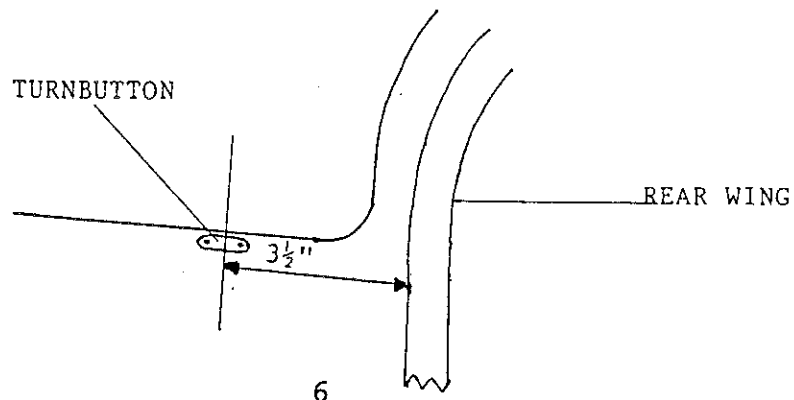
## ATTACHMENT OF WEATHER EQUIPMENT KIT

For ease of marking, stick masking tape onto areas where the hinges are expected to locate and before drilling make sure that all the holes form one line.

4.3 Bolt the hinges onto the outside of the sidescreens using 5mm x 16mm Posidrive screws and nylocs and mount them in place on the windscreen. In order to locate properly, the screens need to be bent around the scuttle, and where these should be bent will be clear when hung.



4.4 The sidescreens are held closed by turnbuttons which secure to the chassis approximately  $3\frac{1}{2}$ " away from the rear wings, and are held in place with self tapping screws. Before drilling the car, carefully check how these will align both with the side screen and with the tonneau cover if supplied.





## ATTACHMENT OF WEATHER EQUIPMENT KIT

4.5 The strap attached to the hinged panel on the sidescreen clips this panel shut onto a popper which needs to be fitted to the top tube just inside the car.

The position of both the popper and its base on the car will be apparent with the sidescreen in position.

### 4.6 Increased Visibility Hood and Sidescreens

For taller drivers a revised hood and sidescreen kit is available which allows greater visibility and elbow room from a redesigned sidescreen and correspondingly realigned hood.

The fitment of the hood is exactly as described in 13.1 to 13.3 the only difference being an enlarged sidescreen aperture.

The sidescreens however differ from the standard variety in that no turnbutton fixing is used although the windscreen pillar hinge arrangement is the same. The increased visibility screens are rigid rather than hinged in the middle, incorporating bulges to accommodate elbows, and therefore a strap fixing is used instead.

The sidescreens are supplied with straps attached perpendicular to the rearmost edge and these secure to popper bases which should be fixed to the top rail of the chassis frame inside the cockpit using pop rivets.

## ATTACHMENT OF WEATHER EQUIPMENT KIT

### 13.5 Erection and Folding

#### 5.1 Erection

If the correct procedure is not followed the hood can prove somewhat tricky to erect so we recommend that the following steps are taken:

- i) Remove the spare wheel from its carrier.
- ii) Slacken the Hoodstraps by easing them around to the sides of the rearmost Hoodstick which effectively lowers the overall height of the erected Hood.
- 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 ease the Hoodstraps round to the top of the rear Hoodstick so tensioning the Hood.
- vii) Some Hoods have the facility to capture the front Hoodstick in a "pocket" secured by Velcro strips. This should be done up last and prevents the Hood from "ballooning" at speed.
- viii) Finally replace the spare wheel in its carrier.

#### 5.2 Folding

In order to preserve your hood and its windows we suggest that it is always carefully folded as in the diagram. (13.5.2)

## Hood Folding

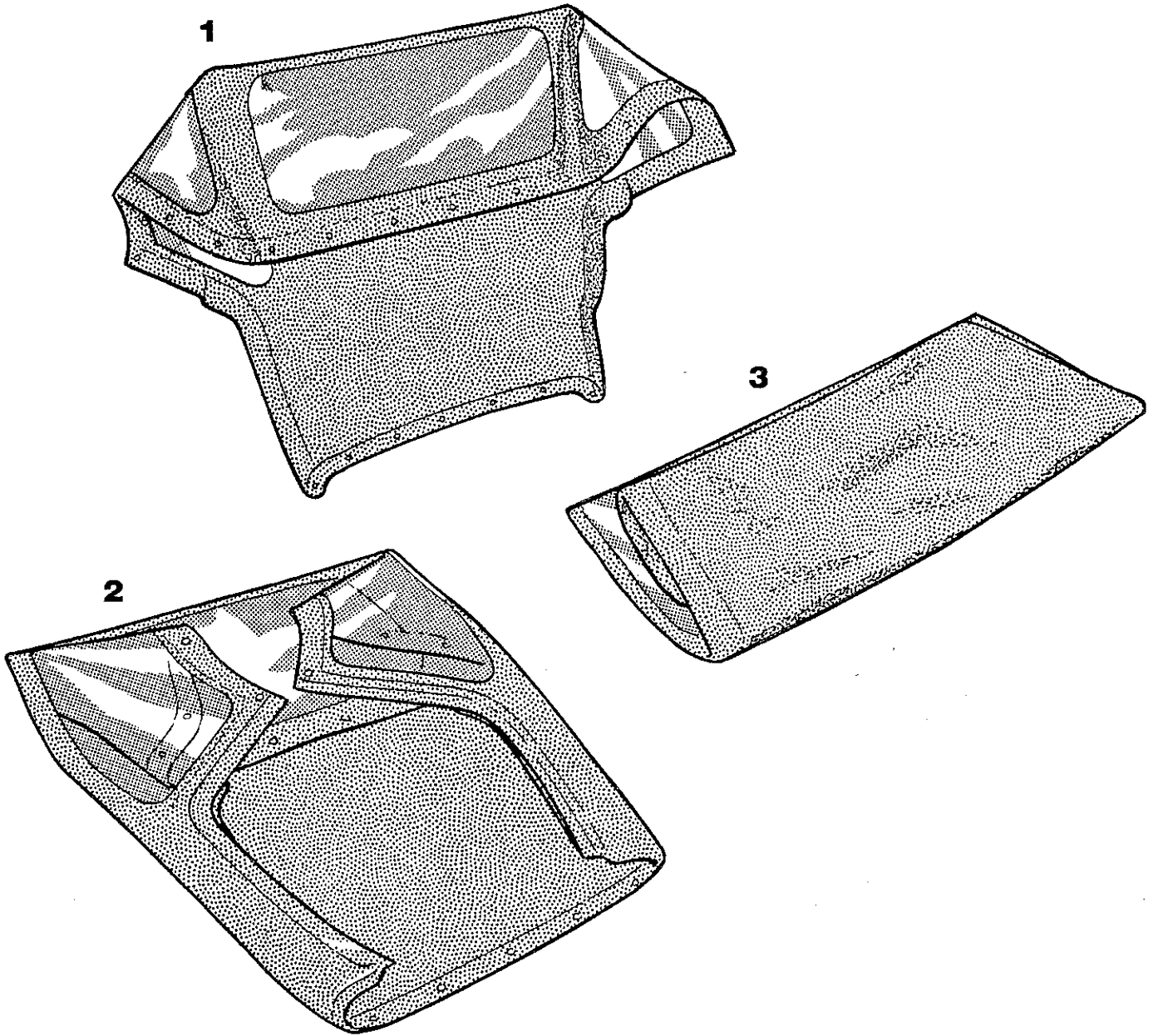


Fig. 13.5.2

## OPTIONAL EXTRAS

There are a wide range of extras available for the Caterham Seven and the attachment of the most popular items are covered by this section.

### 14.1. Heater

1.1 The heater kit includes all the items necessary to install a heater to an existing car.

1.2 The heater unit itself is fitted to the horizontal bulkhead above the occupants' feet and operates by recirculating air from above the gearbox and ducting warm air down through slots into both footwells.

It is held down by four self tapping screws and plain washers so the first step is to lay the unit in place and mark the positions for 1/8" holes to be drilled, checking that it does not foul the steering column. You will also need to mark out on the chassis where the outer ducts locate relative to the bulkhead so that the self adhesive foam seals can be correctly located and stuck on the bulkhead. With these in place, the heater can be screwed into position.

1.3 The heater is wired using 3 connections, the black wire to earth, the red wire to the green/purple on the loom and the white wire to the green/yellow on the loom. The earth is connected to one of the self tapping screws locating the unit.

## OPTIONAL EXTRAS

It will be necessary to drill a 3/8" hole in the vertical bulkhead behind the heater approximately 5" up and 15" in from the lefthand side edge of the chassis in order that the wires can be passed through a grommet to connect with the loom.

1.4 With a 5/8" connection on the water pump, attach one end of the 5/8" diameter rubber tubing to it using a jubilee clip and, mounting it as per diagram 10.7, attach its other end duly trimmed to length, to the left hand connection on the heater with another jubilee.

1.5 Attach the shorter length of 5/8" diameter tubing to the 5/8" connector on the inlet manifold and connect it in turn to the connection on the heater using Jubilee clips. Clip the pipes together so that they run in parallel above the engine with the three clips provided.

1.6 In order to get the heater operational it will be necessary to bleed the air out of it first. This can be done by disconnecting the hoses above the inlet manifold and slowly filling the heater with a water/antifreeze mixture, with the radiator cap removed until the water level in the header begins to rise.

## OPTIONAL EXTRAS

### 14.2. Cibie Halogen Headlights

These fit in the same way as the standard Lucas variety except for the side lights. The standard bulb holder is not fitted and instead you will need to convert the Cibie bulb holder to bullet connections.

### 14.3. Rear Wing Protectors

3.1 These consist of stainless steel panels which are attached to the lower front of the rear wings with 5/32" pop rivets. These are supplied flat and will need to be gently bent to suit the contour of the wings.

3.2 Cut the rubber wing piping strip to fit around the lower outer and upper edges, cutting darts in its flange in order to take up a smooth curvature.

3.3 With the panels pressed against the wing piping strip between the rear wing and chassis, drill through the existing holes and rivet the panels into place on the wing capturing the beading.

### 14.4 Oil Cooler

4.1 The oil cooler plumbing connects to the engine using a special adaptor fitted to the oil filter housing. First remove the filter and then screw the aluminium casting containing the oil cooler connections into its place. Ensure that the rubber seal between this and the oil filter housing is lightly greased to both help tightening and prevent leaks.

## OPTIONAL EXTRAS

This should be hand tightened as over tightening can damage the castings.

When fitted the connections taking the pipes to the cooler should ideally face to the right hand side of the car leaving sufficient clearance for the unions.

The oil filter can now be replaced and should be pre-filled with oil to prevent an air lock occurring in the oil pump. Oil filters must not be re-used.

4.2 Chassis manufactured before May 1987 site the oil cooler hanging on a pair of brackets behind the radiator secured with 4, 1/4" x 3/4" UNF cap head bolts.

For competition purposes a 13 row oil cooler is recommended and this will foul the top of the cooling fan motor unless this has its redundant upper mounting flange removed.

4.3 Chassis manufactured after May 1987 locate the oil cooler in front of the radiator. This is held by two special brackets which are attached to the radiator using the existing mountings at the bottom and the spare holes in the radiator flange at the top. Note that these brackets are not handed and the oil cooler is hung underneath them.

## OPTIONAL EXTRAS

4.4 In both cases there are two oil pipes provided in the kit, but these differ between the earlier and later chassis. The ends which attach to the oil pump/filter housing use 90° unions, common to both varieties, but at the oil cooler there are differences. Earlier chassis with the cooler mounted behind the radiator have one 90° union and one 45° union on the pipes whereas on later chassis the right hand union is straight and the left hand a 90° one. This allows the pipes to be fitted parallel to each other and for tidyness they can be secured together with tywraps.

The oil pipes should be routed upwards from the cooler, over the radiator on later chassis, and down over the front chassis cruciform to the engine. Take great care that these pipes do not foul the steering mechanism or rub on any sharp edges.

### 14.5 HEADLAMP STONE GUARD

These are fitted in front of the headlamps and are designed both to protect against flying stones and to enhance the appearance of the Seven. They are attached to the chromed headlamp surrounds with self-tapping screws on each side of the surround and 1/8" holes will need to be drilled to suit. Please note to take care over the positioning of these holes to ensure that the stone guard grilles are positioned horizontally and vertically.

It is important when drilling the surrounds to avoid contacting the glass headlamp with your drill.



## OPTIONAL EXTRAS

### 14.6 BDR EXHAUST-SYSTEM

The BDR or Competition type stainless steel exhaust system is available for both the Cosworth BDR engine and the Ford 2265E pushrod unit. It differs from the standard system by having a large bore 4 into 1 manifold leading into a larger bore silencer which exits to the side in front of the nearside (LH) rear wheel.

You should be aware that this system is considerably louder than the standard system described in 10.7 but releases more power and is therefore a useful option if any form of competition is envisaged.

6.1 The aperture provided in the body skin is intended to take the standard 4 into 2 into 1 exhaust system and hence is too small for the BDR option. To enlarge it we recommend that you use a small pair of CURVED tinsnips and enlarge the aperture sufficient to allow about 1/4" clearance around the system.

We also suggest that you cover the area around it with masking tape which serves the dual role of protecting the paintwork if appropriate and enabling you to mark clearly where cutting is necessary.

6.2 The aperture is enlarged as follows:

i) Fit the dual pipe serving cylinders 2 and 3 onto the engine and temporarily secure with 5/16" UNC Allen bolts and springwashers, or to studs securing with 5/16" nuts (BDR

## OPTIONAL EXTRAS

engines). This should fit through the existing aperture although trimming at the lower edge will be needed. Mark where the aluminum skin is to be cut and having removed the manifold cut as required.

ii) Replace the dual pipe and now in addition test fit the rear pipe which serves No.4 cylinder. Once again mark where the body skin is to be cut away and remove both parts of the manifold before trimming.

iii) Repeat this exercise with the forward No.1 section.

iv) Finally finish off any sharp edges with a half round or round file and bolt the manifold into place using suitably enlarged gaskets to the cylinder head.

6.3 The manifold pipes can now be fed into the fabricated 4 into 1 piece and secured using the two 1/4" x 3/4" UNF bolts, plain washers and nylocs. We recommend that plenty of Firegum or similar is used to obtain a good seal.

6.4 The silencer mounting bracket and rubber bobbin attaches in the same way as with the standard system (10.7.4). Slide the silencer unit over the end of the 4 into 1 piece, again using Firegum, and secure the rear of the silencer to the bobbin using a plain washer and 5/16" UNF nyloc nut.

Use the clamp provided to secure the silencer to the 4 into 1 piece twisting the silencer to make certain that the side pipe is not too close to the ground.

## OPTIONAL EXTRAS

6.5 Finally attach the exhaust guard using long Jubilee clips in the same way as with the standard system (10.7.8).

### 14.7 Air Horn

7.1 The air horns should be mounted in the engine bay on the passenger side of the car. Each horn should be bolted to the deflector plate of the heater. This should be done before the heater is fitted into the car. If no heater is fitted, the horn should be bolted to the horizontal engine bulkhead itself. The compressor should be mounted on the vertical part of the bulkhead, again on the passenger side.

7.2 The wiring for the air horns is included in the loom and no additional fuses or relays are required. The two wires (one black, one purple/white) exit from the loom in the area of the fuse box which is located inside the car. These two wires should be passed through holes drilled in the bulkhead (using a rubber grommet to prevent the wires chaffing on the aluminium).

7.3 Terminals should then be fitted to the two wires and connected as follows:

Black wire to negative terminal on compressor.

Purple/white to positive terminal on compressor.

The air horns will now operate using the existing horn switch located on the dash.

## OPTIONAL EXTRAS

### 14.8 Electronic Ignition

8.1 If you have opted for an electronic ignition kit, you will be supplied with the following:

One main kit (including amplifier and fixing kit).

One distributor kit (including roter for distributor).

8.2 The amplifier (finned aluminium box) should be mounted inside the engine bay on the vertical bulkhead as near to the speedometer cable grommet as possible. The wire and connector can then be passed through the grommet to the inside of the vehicle and connected up to the terminal block exiting from the loom above the gear box tunnel.

It should be noted that for left hand drive cars, the amplifier box will need to be fitted upside down to allow the wire to exit the box on the correct side.

8.3 To fit the distributor kit, follow the instructions provided with the main kit. The distributor loom can then be connected to the terminal block exiting from the vehicle loom on the right hand upper engine bay diagonal.

### 14.9 Boot Cover

9.1 The boot cover is designed to attach semi permanently to the top of the bulkhead behind the seats and to clip onto the same fasteners as those provided for the hood at the rear of the vehicle. When not in use, ie. when the hood is erected, it folds away into the boot area.

## OPTIONAL EXTRAS

9.2 The cover is designed to fit around the optional rollover bar, but since there are two types - road and competition - be sure to order the correct cover. Due to the positioning of the competition bar, it will be necessary to remove it before the boot cover can be fitted.

9.3 Two eyelets are provided at the front of the cover which fit over the shock absorber tops and hence roughly align the cover.

Measure carefully the centre point of the car across the rear bulkhead and mark the positions for six 1/8" holes to be drilled in the middle of the tube at  $1\frac{1}{4}$ ",  $7\frac{3}{4}$ " and  $14\frac{1}{4}$ " each side of the centre line.

Drill corresponding holes through the front edge of the boot cover aligning the front edge with the front edge of the bulkhead, and secure six popper bases with the small self-tapping screws provided.

9.4 Stretch the boot cover over the luggage area and establish locations for the poppers. We suggest that you fit the outermost poppers on the flat rear panel first since these will hold the cover evenly in position while the others are marked up. We suggest also that masking tape be used to assist with marking and that poppers are fitted in the same way as in the weather equipment section.

## OPTIONAL EXTRAS

9.5 Fit the remaining poppers across the rear and sides of the boot area except for the forward two poppers on each side (see diagram).

If a tonneau cover is also to be fitted the normal popper outer or male part will have to be substituted by a further popper base. The kit includes special bases with small 1/8" centre hole to enable them to be riveted together with the normal popper inner. The rivet should pass from the inside outwards as shown.

### 14.10 Tonneau Cover

10.1 The tonneau cover can be fitted once the boot cover is in position since it is attached to the same mountings. Firstly, it should be secured at the front of the cockpit and it is advised that the windscreen is removed for this purpose.

Establish the centre line (the screen washer nozzle helps here) and mark two points each 1<sup>1</sup>/<sub>4</sub>" outboard of this line. Check under the dashboard as to where the main tube supporting the scuttle is located and drill two 1/8" holes down through the scuttle into it. The exact distance forward of the scuttle edge will vary slightly from car to car but will normally be about 1".

10.2 Carefully align the tonneau along the centre line of the car and fit two poppers at the front to correspond with the bases just fitted. Refit the windscreen.

## OPTIONAL EXTRAS

10.3 Similarly fit two poppers to the tonneau so as to attach the rear of the cover to the centre two bases on the rear bulkhead, taking care to ensure that the tonneau is neither sagging nor under excessive tension.

10.4 Mark and drill holes and fit two further popper bases on the scuttle approximately  $1\frac{3}{4}$ " inward from the lower inner edge of the windscreen support where it joins its triangular base (see diagram). Stretch the tonneau carefully into position and fit poppers.

10.5 Mark and drill holes and fit two popper bases 0.6" below the rear lower edge of the scuttle, 1" rearward of the centreline of the large securing rivet. Again stretch and fit the tonneau with poppers.

10.6 Mark and drill holes and fit two popper bases at a point 2" down from the top rear of the doorway and  $1\frac{3}{4}$ " forward of the rear mudguards.

Hook the eyelets in the rear edge of the tonneau over the shock absorber tops and stretch down over these popper bases, fitting poppers as appropriate.

10.7 Finally, fit the remaining poppers necessary to secure the rear sides and rear edge of the tonneau onto the boot cover and rear bulkhead respectively.

## OPTIONAL EXTRAS

### 14.11 Rear Anti-Roll Bar

11.1 The rear anti-roll bar is available for De-Dion cars only and it should be noted that the kit includes alternative rear radius arm to locate the De-Dion tube which include mounting holes to take the drop links to the anti-roll bar.

If these have not already been fitted during the rear suspension stage, refer to and substitute for the standard items.

11.2 The anti-roll bar itself is held by two aluminium clamps to brackets incorporated on the inside edge of the chassis frame behind the bottom cross member immediately behind the De-Dion tube.

Establish approximately where the anti-roll bar will locate and then carefully remove the paint from it where it passes through the clamps in the same way as with the front anti-roll bar.

Bolt the bar into place with the 1" x  $\frac{5}{16}$ " bolts, plain washers and nylocs, noting that the holes provided on the clamps for grease nipples should be downward. Slide a small jubilee clip over each end of the bar down as far as the clamp and tighten to prevent side to side movement.

Fit the grease nipple and fill with grease using a grease gun.



## OPTIONAL EXTRAS

11.3 Referring to diagram 14.11.3, slide onto each end of the anti-roll bar the bottom clamps which should be left slack for the time being.

With the 1/4" bolts, washers and nylocs provided attach the drop links onto these clamps so that they point upwards. The drop links consist of a short piece of threaded tube with a "rose" joint screwed into each end. You should check that these are of equal length before fitting, adjustment being a straightforward matter of screwing or unscrewing the rose joints into or out of the tubes.

Swing the anti-roll bar upwards until a 1/4" bolt can be passed through the upper rose joint into the mounting provided in the rear radius arm. If one side appears not to line up slide the clamps along the bar until they line up on both sides. Do not attempt to connect the bar by stretching either end up or down since this will have the effect of pre-loading the rear suspension with detrimental handling effects.

11.4 The drop link clamps can be slid along the bar in order to adjust its anti-roll effect. We suggest initially that the bar is set in the forward (softest) position, and locked by tightening the 1/4" clamping bolts, taking care that the drop links do not foul any part of the rear suspension

The car will prove quite sensitive to anti-roll bar settings so small adjustments will give noticeable effects.

## OPTIONAL EXTRAS

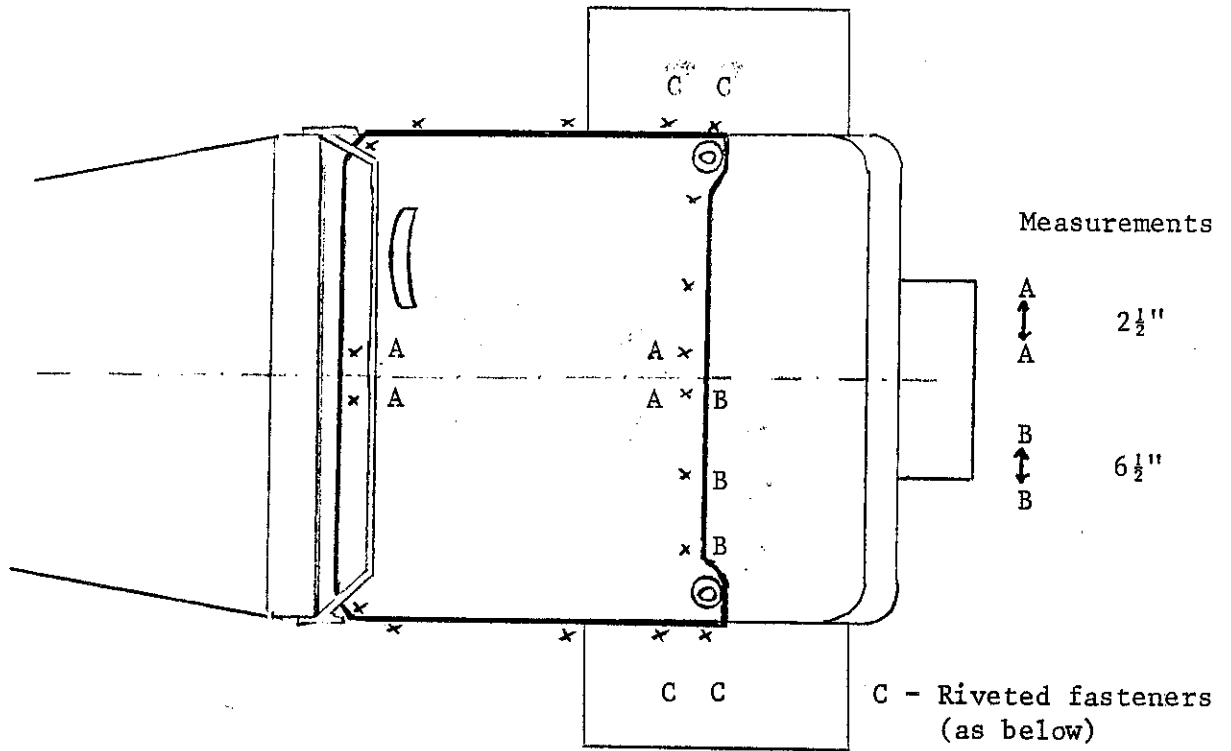
### 14.12 Wind Deflectors

12.1 The Wind Deflectors available from Caterham Cars locate onto the mountings fitted to the sides of the windscreen used for the sidescreens.

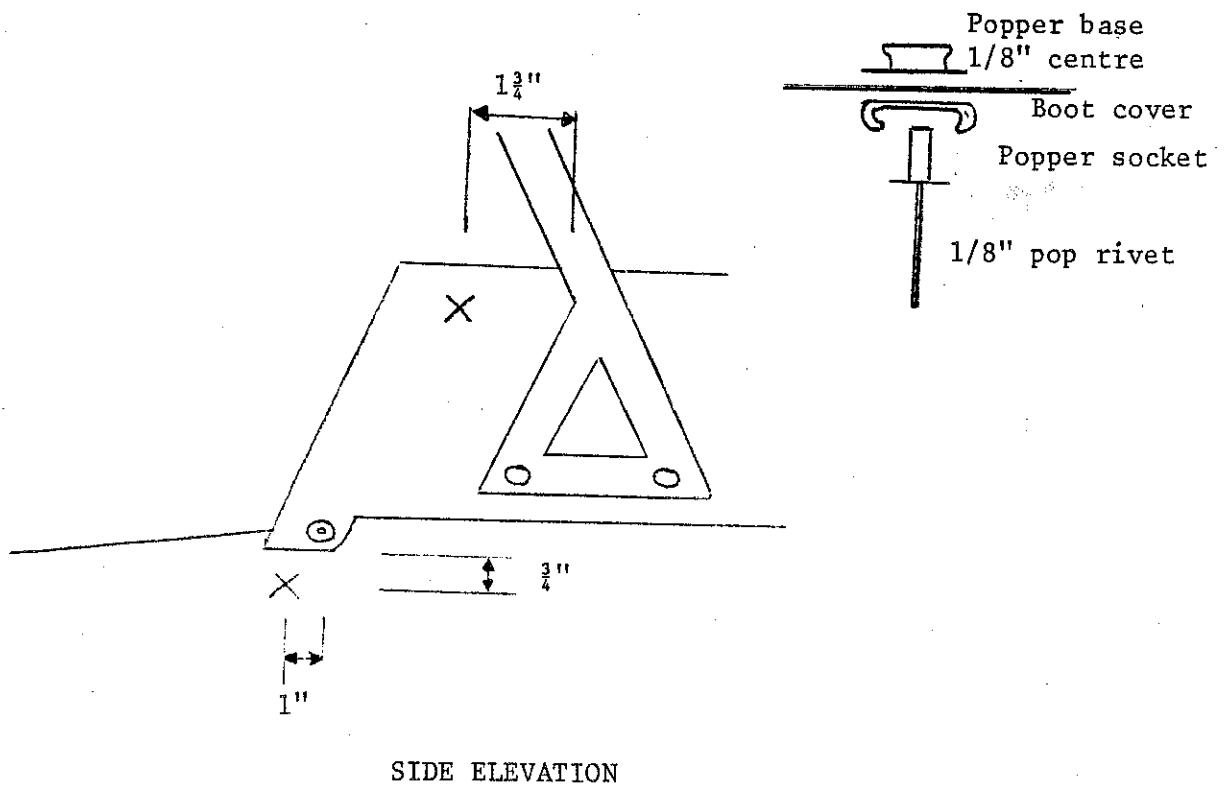
12.2 These are manufactured from ICI cast acrylic sheet of high quality and are 10 times more impact resistant than glass.

It is extremely important however that they are not cleaned with any solvents as it is likely that the surface will be damaged. Use soap and water and rinse off, or use "Mr Sheen" or similar polish. The occasional use of "T" Cut will remove any polish built up, and any small scratches but do not use a power tool buffer.

TOP ELEVATION



TONNEAU COVER SHOWING LOCATION OF FASTENERS



SIDE ELEVATION

Fig. 14.10

# Rear Anti-Roll Bar Assembly

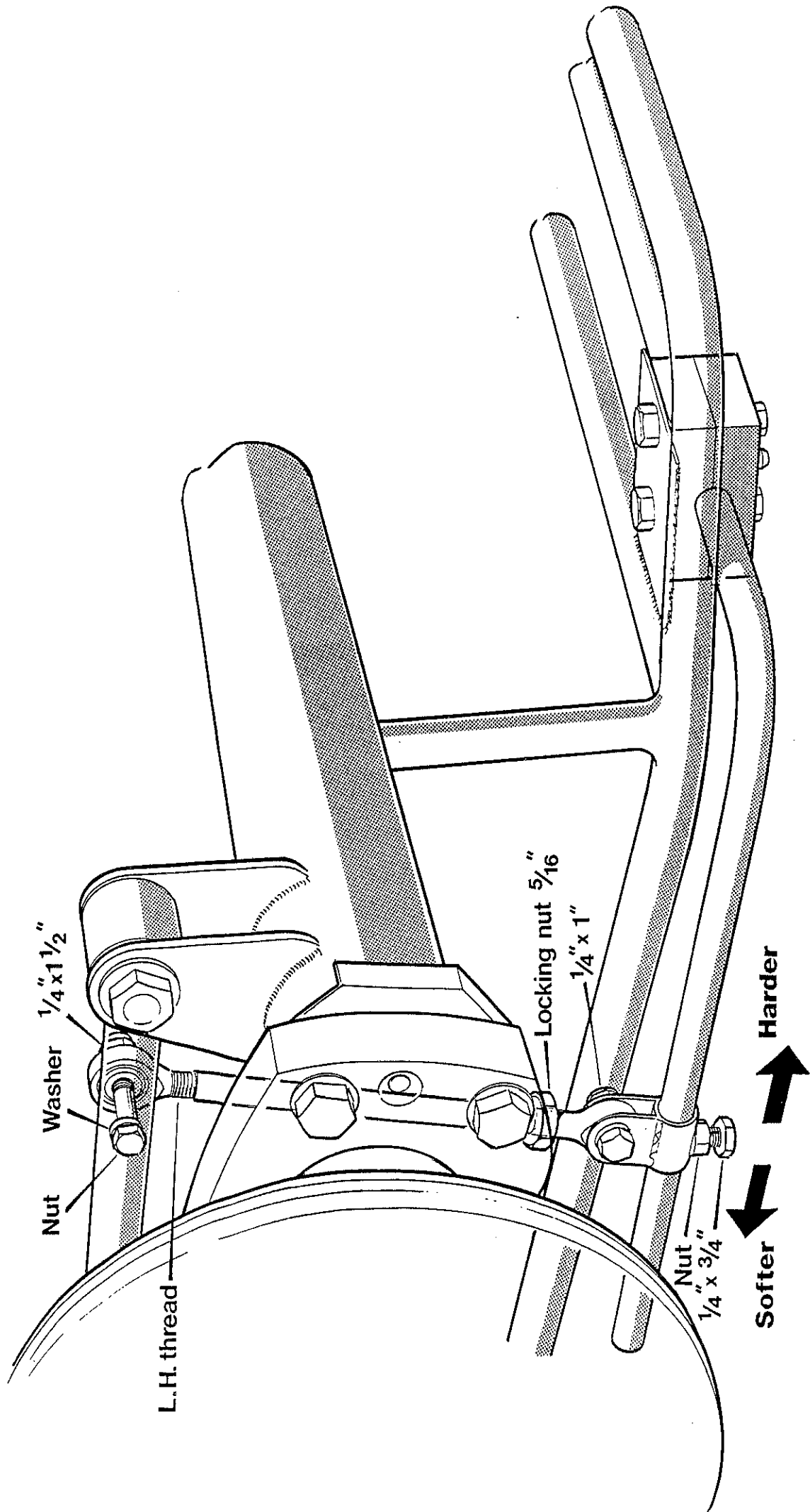


Fig. 14.11.3

## REGISTRATION PROCEDURE

One of the advantages of building the car from a kit is that by obtaining a 'Q' registration number, you not only avoid paying Car Tax, but also avoid the normal ageing of a traditional plate.

To be eligible for a current prefix it will be necessary to have constructed the car from all new parts, i.e. no second hand or reconditioned items, thereby qualifying for a Certificate of Newness from Caterham Cars. Before the car can be registered Car Tax will have to be paid and you should contact your local Customs and Excise office with VAT receipts so that this can be assessed. They will give you a certificate of tax paid which will enable you to get the car registered as new.

The procedure for registering a car on a 'Q' plate is straightforward and as long as the car contains some used components Car Tax assessed at approximately 10% is avoided. The following steps should be followed:

1. Obtain the form V55/5 from your nearest vehicle licensing office.
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.

## REGISTRATION PROCEDURE

3. Take the vehicle to the nearest approved MOT testing station and obtain a pass certificate. The law states that, providing the vehicle is covered by Third Party Insurance, it can legally be driven to and from the nearest testing station for the purpose of obtaining this certificate as long as a prior appointment has been made. If you are worried by this, either deliver the car yourself on a trailer or ask for the MOT station to collect your car on trade plates.
  
4. Present yourself at the vehicle licensing centre - not your local post office - with the following information:
  - a) Completed form V55/5
  - b) MOT pass certificate under your chassis number
  - c) Certificate of Insurance
  - d) Bills for all the parts bought showing that VAT has been paid on all new items. Receipts for second hand parts should also be produced and in particular for the engine, gearbox and rear axle.
  - e) Your cheque (or cash) for the road tax.
  
5. Subject to the above being satisfactory, the licensing office will probably arrange for your vehicle to be inspected before a registration can be issued. There may be a delay before the local inspector can visit you, but to speed up the process, it may sometimes be possible to take the car to the local inspection site on a trailer.

## REGISTRATION PROCEDURE

6. Assuming the inspection proves satisfactory - and on a new Caterham it is unlikely to be otherwise - the authority is given for your registration to be issued. Your tax disk can then be collected from the licensing office.

Generally this inspection is to prove the existence and correct identity (engine and chassis numbers) of your vehicle, not a safety or Construction and Use check.

7. All that remains is to order a set of number plates and notify your insurance company of the registration.

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

## PREPARATION FOR COMPETITION

Due to the difficulty - and illegality - of using the Caterham Seven's full power on the public roads, many owners choose to use their cars in competitions, such as autotests, sprints, hillclimbs and circuit racing.

Caterham Cars, in conjunction with the British Racing and Sports Car Club (BRSCC), run a circuit racing championship specifically for Caterham and Lotus Sevens, which are essentially road going cars.

This is run in three separate classes so that there is no reason why a standard car, straight from the showroom, cannot be raced as long as some basic safety orientated modifications are made.

This section of the manual seeks to explain how to prepare a car for competition and details the organisation and administration required before you can take part.

Section 16.1. How to enter - driver requirements.

16.2. Preparation for the Caterham Cars/BRSCC racing championship.

16.3. Preparation for hillclimbs and sprints.

16.4. Performance Options



## PREPARATION FOR COMPETITION

### 16.1. Driver Requirements for Competition

1.1 In order to take part in any form of motorsport, it will be necessary to obtain a competition licence from the RAC, who co-ordinate all motorsport in this country.

For Autotests, Sprints and Hillclimbs you will need a 'Speed licence' and unless you intend to contest a national championship, a 'Restricted licence' will suffice. No special qualification or experience is needed for a 'National licence', however.

For circuit racing, a Restricted Race licence will be needed and in order to be issued with one of these, you will need to visit your doctor with the licence application form for a medical check up. He will probably charge you a nominal sum for this. No specific level of fitness is needed but unless you have a history of heart disease, mental instability, a wooden leg, or VERY bad eyesight, you are unlikely to be disqualified.

Licence application forms are obtainable from RAC MOTOR SPORTS ASSOCIATION LIMITED, 31 BELGRAVE SQUARE, LONDON SW1X 8QH. TEL: 01.235 8601.

1.2 Before taking part in motorsport, it will also be necessary to join an RAC affiliated Car Club. Because of the 'Restricted' licence, only members of invited clubs may participate in meetings. Unusually, no more than six clubs are

## PREPARATION FOR COMPETITION

invited, so it is important to join the correct club.

For hillclimbs and sprints, we recommend that you join the BRITISH AUTOMOBILE RACING CLUB (BARC) who are invited to most hillclimbs and sprints in the UK and who also run their own championship. Their address is BARC, THRUXTON CIRCUIT, ANDOVER, HANTS SP11 8PN TEL: 0264 772696.

If you wish to participate in the Caterham Seven championship, it will be necessary to become a racing member of the BRITISH RACING AND SPORTS CAR CLUB (BRSCC). Their address is BRSCC, BRANDS HATCH CIRCUIT, FAWKHAM, DARTFORD, KENT DA3 8NH TEL: 0474 874445.

There is another racing option for Seven owners, which is the Roadgoing Sportscar Championship run by the 750 MOTOR CLUB. This caters for all makes of road registered sports cars, from Porsches to Triumph Spitfires, run in appropriate classes. If you wish to join the 750 MOTOR CLUB LIMITED their address is 16 WOODSTOCK ROAD, WITNEY, OXON OX8 6DT TEL: 0993 2285.

1.3 Once you have joined a suitable club and obtained a competition licence, the next step is to obtain entry forms for your chosen events. These can be obtained from the organising clubs and should be submitted in good time before the closing date. You should note that hillclimbs in particular tend to be oversubscribed, so get entries posted early in order to avoid disappointment.

## PREPARATION FOR COMPETITION

The organisers will send you an acknowledgement of entry, normally by return, which will tell you whether your entry is accepted, rejected or placed on a reserve list. If you are told that you are a reserve, telephone to find out why, and what chance you have of actually racing.

1.4 When you receive your competition licence you will also receive a copy of the annual RAC Blue Book which contains all the regulations pertinent to motor sport in this country. In it you will find the specification for approved crash helmets which are mandatory for hillclimbs, sprints and circuit racing. Seven drivers will also need either goggles or a helmet visor. Although open face helmets will be allowed in 1987, only full face helmets will be permitted from 1988.

You should wear fireproof overalls, long johns (both tops and bottoms) and gloves, although balaclavas and boots are a matter of preference. However, it is advised to use all protective clothing available. You will not be allowed to race without the proper clothing and overalls should be considered as the minimum.

1.5 At each competition meeting there is a routine which must first be observed by all competitors. Firstly, you will have to 'sign on'. You will need to present your competition licence, club membership card and (for road going classes) current MOT and insurance certificates. You should also hand in a completed commentators' information sheet. Assuming that all your

## PREPARATION FOR COMPETITION

documentation is in order, you will next be issued with a scrutineering ticket which should be taken, with your car and crash helmet, to the scrutineering bay. Your car and helmet will be checked to ensure that you have observed all regulations. New helmets will need an RAC sticker to be applied. These are available from the scrutineers at the meeting if not supplied with the helmet already.

As general advice, always arrive in plenty of time. Although the final instructions issued a week or so before the event will give signing on, scrutineering and practice times, be prepared for queues or problems with your car. If the scrutineer fails to pass your car, you will need time to remedy the situation before practice.

Under no circumstances will you be allowed to practice without a scrutineering pass and you will not be allowed to race if you miss practice. Occasionally it is possible to practice in a later session with a different class, which means that you will be able to take part in the event, BUT YOU WILL NOT BE TIMED which means that you will have to start at the BACK of the grid with a ten second penalty to boot!

### 16.2. Preparation for Circuit Racing

Before a car can be raced, it will be necessary for it to be scrutineered. Two factors are taken into consideration during scrutineering; safety and eligibility.

This manual does not seek to cover eligibility, except to say

## PREPARATION FOR COMPETITION

that a Caterham Seven purchased in component form, or built up from a kit using a current specification engine will be eligible for one of the classes in the Caterham Cars BRSCC Road Going Championship. Detailed regulations are available from Caterham Cars or the BRSCC.

### 2.1 Rollover Bars

The standard Caterham bar is not suitable for racing and needs to be replaced by the competition bar. This is mounted to the rear suspension towers and is braced to the upper tube at the rear of the boot and on De Dion cars by a removable diagonal which locates within the passenger compartment. If you do not specify this bar when ordering your kit, do not worry since the threaded mounting for this brace is provided on all chassis and can be found one inch below the joint where the dashboard mounting tube is welded to the upper chassis rail on the nearside of the cockpit behind the trim panel.

The De Dion bar is specifically designed to fit underneath the hood, but drivers over six feet tall should note that the top of a helmeted head must be at least two inches below the top of the bar. If this not possible a rollover bar specialist such as John Aley should be consulted.

The bars available for short and long cockpit cars are considerably taller but will not fit under the hood.

## PREPARATION FOR COMPETITION

### 2.2 Seat Belts

The standard lap and diagonal belts are not suitable for racing and should be replaced by a four or six point competition harness. This uses the standard lower seat belt mountings, but the shoulder straps mount to the top rear crossmember where suitable threaded holes are provided.

By some quirk in the law, these belts are not technically legal on the road and although the police are extremely unlikely to pick you up on it, some MOT testing stations may be particular.

Full harness belts designed for the Seven and manufactured by LUKE are available from Caterham Cars.

### 2.3 Fireproof Rear Bulkheads

RAC regulations state that there should be a firewall between the cockpit and petrol tank. In long cockpit and De Dion cars, the rear of the driving compartment is fully panelled anyway, but short cockpit cars will need plating up with aluminium sheet or similar material.

The other area that will need attention is the boot floor. The carpet should be removed and the wooden floor covered with aluminium sheet. A box will also need to be fitted around the petrol filler.

Caterham provide an aluminium boot floor and fuel filler cover for this which are held in place with self tapping screws.

## PREPARATION FOR COMPETITION

Ideally the edges where these parts meet the existing aluminium boot floor and sides should be sealed using glass fibre, but in practice, scrutineers appear happy if the gaps are carefully sealed with tank tape.

### 2.4 Emergency Cut Off Switch

Should your car be involved in an accident or become stationary on the circuit, the Marshalls will wish to isolate the battery and ignition circuits. An isolator switch must be fitted which enables this to be done from outside the car and we suggest that this is mounted within the triangulation of the windscreen stay on the offside. These switches, along with full wiring kits, are available from Caterham Cars. They also have the advantage of acting as very effective theft deterrents since they have a removable key. You will need to affix a warning sticker with an "OFF" arrow in the immediate vicinity of the switch.

### 2.5 Fire Extinguisher

It is also a requirement for all cars to carry a 2.5 kilo BCF or equivalent fire extinguisher which should be securely mounted within reach of the driver. We suggest that the best location for this is bolted to the cockpit floor on the passenger side. Fully plumbed in systems are expensive and not mandatory. A hand held extinguisher will suffice.

### 2.6 Throttle Return Spring

Cars must be fitted with an alternate means of closing the throttle in case the normal return spring on the carburettor

## PREPARATION FOR COMPETITION

fails. Weber DCOE carburettors contain a small spring within them but since these are very weak and frequently break anyway, scrutineers are not happy to approve them. It is therefore necessary to fit an additional throttle spring acting directly on the butterfly spindle in some way.

On cars fitted with twin Weber DCOEs or equivalent Dellortos we suggest that, since the spring in the Caterham installation works on the rear carburettor, you fit an extra spring on the forward one.

Please contact Caterham Cars if you have any problems achieving this.

### 2.7 Oil Catch Tanks

When racing, an engine's tendency to lose oil through its breathing system is amplified. It is therefore a regulation that the breather output should be routed into a translucent catch tank of at least two litre capacity. Caterham can supply an additional screen washer bottle and bracket for this purpose.

### 2.8 Headrest

It is a requirement that a head restraint should be attached firmly to prevent the driver's head moving back in an accident. Suitable restraints are available from Caterham and clamp to the diagonal of the roll cage.



## PREPARATION FOR COMPETITION

### 2.9 Ignition Switch

The ignition switch should be clearly marked with an arrow indicating the "OFF" direction. A suitable sticker affixed to the dashboard above the switch will suffice.

### 2.10 Lamps

To prevent glass getting on the track in the event of an accident, all glass lamp lenses should be taped over. The only glass lenses on a Caterham are the headlights and reversing lights, so it will not be mandatory to tape over rear lights, indicators etc. although many people do so.

### 2.11 750 Motor Club Road Going Sports Car Championship

Generally a car prepared for the Caterham Cars BRSCC series will also be eligible for this championship. However, the 750 Motor Club permit a car to be run in a more modified form and we suggest you study both sets of regulations carefully.

### 2.12 RAC Blue Book

All these requirements are contained in the Blue Book which is updated annually. Sections Q, QS, QA, QG 9 (Production Sports Car Formula) and relevant sections of QM should be referred to. This book also gives details of event programmes, circuit addresses etc and is sent automatically to a registered licence holder.

## PREPARATION FOR COMPETITION

### 16.3. Preparation for Hillclimbs and Sprints

3.1 A car prepared for racing will be fully eligible for hillclimbs and sprints provided that the vertical strut specified in 16.3.3 is fitted.

3.2 The following items in section 16.2. are NOT mandatory for cars competing in hillclimbs and sprints:

- 2.4 Emergency cut off switch
- 2.5 Fire extinguisher
- 2.8 Head restraint

3.3 A vertical timing strut must be fitted to the nosecone of the vehicle which must be opaque and non-reflecting. Viewed from the side it must measure 10 inches high and two inches wide and be fitted in a position so that its base is eight inches from the ground and its top 18 inches from the ground.

An ideal material for this is sheet aluminium, painted matt black and this can easily be attached to one of the front numberplate mountings.

## PREPARATION FOR COMPETITION

### 16.4. Performance Options

Caterham Sevens can be specified with optional features that improve their track performance without compromising their day to day use on the road. This manual does not cover engine tuning since this is very much a matter of budget, taste and class eligibility. Due to the three types of engine used by Caterham Cars (Ford 2265E Pushrod, Lotus Twin-cam, Cosworth 16 valve BDR), such information would require a manual on its own.

#### 4.1 Lowered and Up-rated Springs

These are available for both live axle and De Dion cars and sharpen up the handling in exchange for a stiffer ride. Definitely recommended for competition purposes and can be specified instead of standard items when ordering kits.

#### 4.2 Adjustable Abutment Shock Absorbers

These dampers are a direct swap for the standard items and have identical characteristics except that they have adjustable spring platforms which allow the ride height to be altered. Where competition springs and lower than standard profile tyres are fitted, these allow normal ride height to be regained for road use whilst deriving handling benefits from low ride height on the track. These are available under Caterham part numbers or can be incorporated within the kits at extra cost.

#### 4.3 Rear Anti-Roll Bar

For circuit use, standard De Dion cars will suffer excessively from understeer. This feature is generally an aid to stability

## PREPARATION FOR COMPETITION

and makes safer driving on the road, but will probably prove too much on the track. Caterham Cars have therefore developed an adjustable anti-roll bar which can be added to the rear suspension kit which enables the cars handling balance to be changed to suit the driver's individual preference. Anti-roll bars are not available or considered necessary for live axle cars.

### 4.4 Negative Camber Front Wishbones

These are a straight replacement for the standard items and provide 1° of negative camber at normal ride height. Again these can be ordered at the same time as the front suspension kit and provide better turn in characteristics at high speeds.

### 4.5 Axle Baffling

Under racing conditions Ital/Marina rear axles can suffer oil surge due to being subjected to G forces not anticipated by their designers. To overcome this problem we fit special baffling inside the axle and ideally this should be done whilst the axle is being modified initially. If you intend to use your car for competition purposes we strongly suggest that you have this done in order to avoid premature wear and possible failure.

## FINAL CHECKS AND SERVICE INFORMATION

### 17.1. Final Checks before taking to the Road

1.1 Before the car is used, make doubly sure that all bolts securing suspension, steering and brakes are properly tightened and that no wires or brake hoses are positioned in such a way as to foul anything that moves or gets hot in use. Particular care should be taken with wires in the vicinity of the exhaust manifold.

1.2 Wheel nuts should not be overtightened and we suggest they be torqued to 40-45 lb ft with the car on the ground.

Tyre pressures should be as follows:

	lb ft
front	18 - 20
rear	18 - 20

1.3 Engine, gearbox and rear axle/differential oil levels should be checked and/or filled as follows:

Engine	SAE 15W/40 (UK climate)	3.3 litres
Gearbox	Gear Oil GP 80 (5 Speed)	1.9 litres
	(4 Speed)	0.9 litres
Differential	Gear Oil EP 90	0.9 litres
Axle (Marina/Ital)	Gear Oil EP 90	0.7 litres
Brake Fluid	SA3N 1703 DOT 3	

## FINAL CHECKS AND SERVICE INFORMATION

1.4 The spring damper units fitted to the car are adjustable for stiffness which enables the owner to tailor the ride/handling compromise to his own needs. There are twelve settings available which can be felt as clicks when the adjusters are turned.

As an initial setting, we suggest that they be adjusted to the fully soft position anticlockwise.

### 17.2 Pedal Adjustment Facility - 1988 De Dion Only

2.1 De Dion cars manufactured from March onwards are fitted with a revised 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.

2.2 When a kit leaves the factory the pedals are set to give the maximum leg room. Although it may appear possible to increase this further, any attempt to move the pedals forward will restrict pedal travel, interfering with the correct operation of the master cylinder and preventing the dual circuit

## FINAL CHECKS AND SERVICE INFORMATION

fail safe facility from operating thus rendering your vehicle both illegal and potentially dangerous.

2.3 In order to move the pedals closer to the driver the following procedure should be followed:

Remove the 12 finger tight screws in the lid of the pedal box and lift off the lid.

2.4 Install the clutch cable adjusting at the bellhousing in order to bring it level with the brake pedal as in 10.3.4. and also the throttle cable.

2.5 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 brought nearer to you, remembering that no more legroom is available

2.6 Firstly adjust the brake pedal, and this 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 front hole to the rear hole.

Note that if the movement required is more than 2" then the adjustment available on the pushrod will not be sufficient.

## FINAL CHECKS AND SERVICE INFORMATION

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

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

In order to level the throttle with the brake and clutch it may be necessary to move the bolt to one of the alternative mounting points. The threaded portion of the throttle cable can then be adjusted to take up any lost movement in the pedal.

2.9 The pedal box lid can now be replaced and the 12 fixing screws properly tightened.

### 17.3. Caterham Cars Inspection Service

When your Seven is finally completed and ready for the road we strongly recommend that you make use of our Post Build Check facility carried out at Crayford. The Seven even in its lowest state of tune possesses acceleration and cornering abilities far in excess of most road going cars and it is therefore extremely important that it is assembled and set up correctly.

We are also keen to ensure that our customers do not suffer disappointment as a result of premature component failure due to incorrect assembly or sub standard performance.

The Post Build Check therefore includes:

- a) Checking assembly of all suspension and steering parts



## FINAL CHECKS AND SERVICE INFORMATION

- b) Checking both braking systems for leaks or faulty assembly
- c) Checking all electrical installations and circuits
- d) Checking installation and lubrication of engine gearbox and rear axle
- e) Checking body and weather equipment
- f) Road test by Caterham's Development engineers

Any defects found can be either rectified immediately, or brought to the customers attention for future correction.

The basic Post Build Check costs £35.00 + VAT (Jan 1988)

Ring MIKE DIXON on 0322 59125 to book your car in for inspection allowing at least two weeks notice. We believe very strongly in the integrity of our product and our engineers will be happy to sort out any final problems you may encounter, but if you want us to carry out any additional work please let us know well in advance so that sufficient time can be made available.

If an inspection at Caterham is not possible you will find a copy of the factory post build sheet at the rear of this section.

### 17.4 Running In Period

If your car has been built using a Caterham supplied engine and gearbox we advise the following running in procedure which has recently been revised. The oil companies have substantially reduced the lead content in petrol, substituting long chain polymers.

## FINAL CHECKS AND SERVICE INFORMATION

In addition to increasing knock resistance, these polymers act as wear inhibitors thus preventing the engine from bedding in as quickly.

Accordingly the running in period has been condensed as follows:

0-100 miles	3500 Max revs	No labouring
100-300 miles	4000 Max revs	No labouring
300-500 miles	4500 Max revs	No labouring
500-1000 miles	Build up revs steadily with occasional use of 6000 rev maximum but continue to avoid labouring.	

At 500 miles (800 kilometres) the initial service should be carried out and this is detailed at the rear of this section.

### 17.5 Service and Maintenance

Your Seven can be serviced and maintained at the factory or alternatively by yourself. The factory service schedule is included for reference at the rear of this section.

There is also a wiring diagram which should be referred to in the event of any electrical problems.

UNDERBONNET SERVICE LOCATIONS

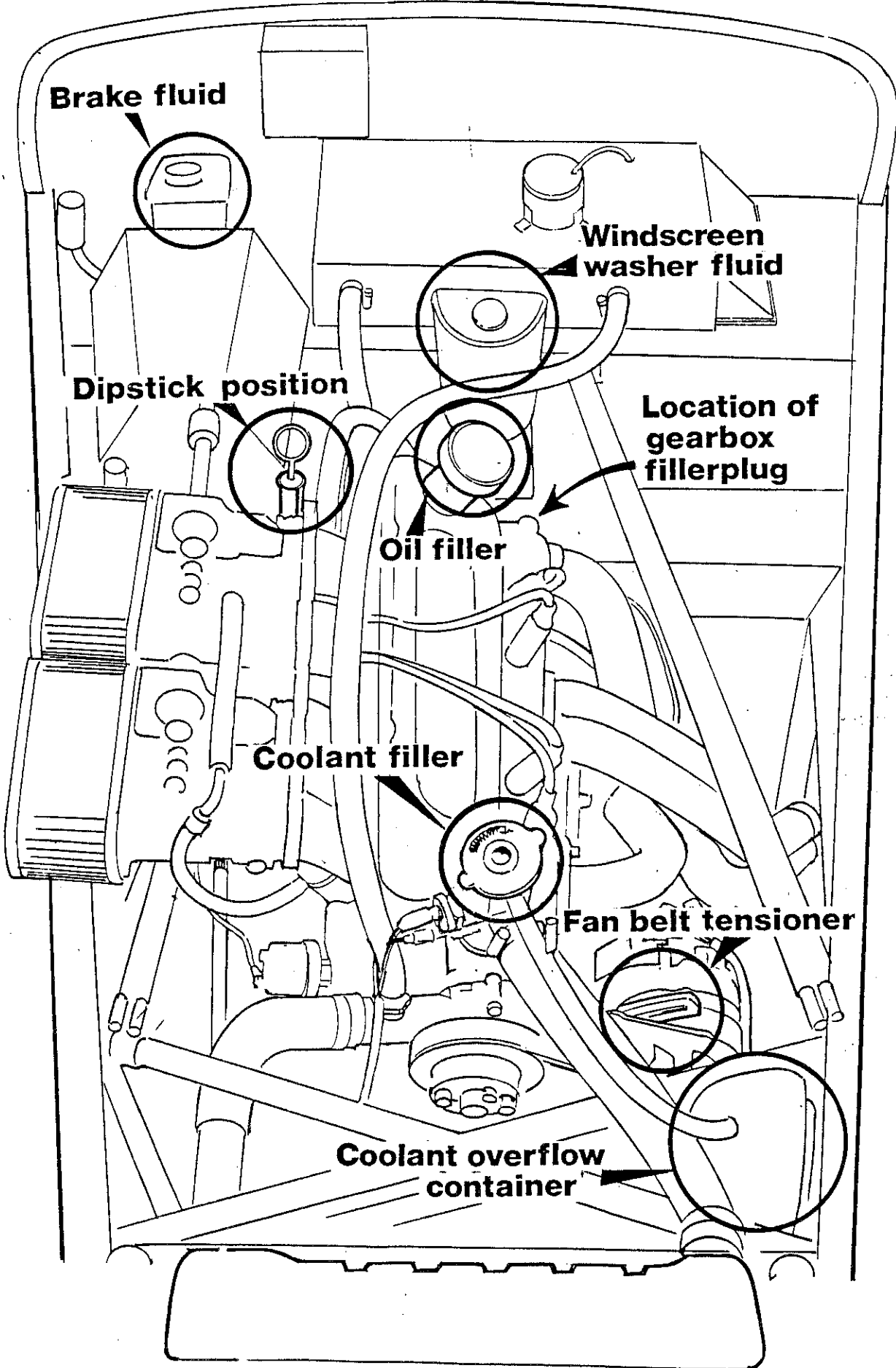


Fig. 17.5

# DASHBOARD LAYOUT - RIGHT HAND DRIVE CARS

( N.B. LHD is mirror image )

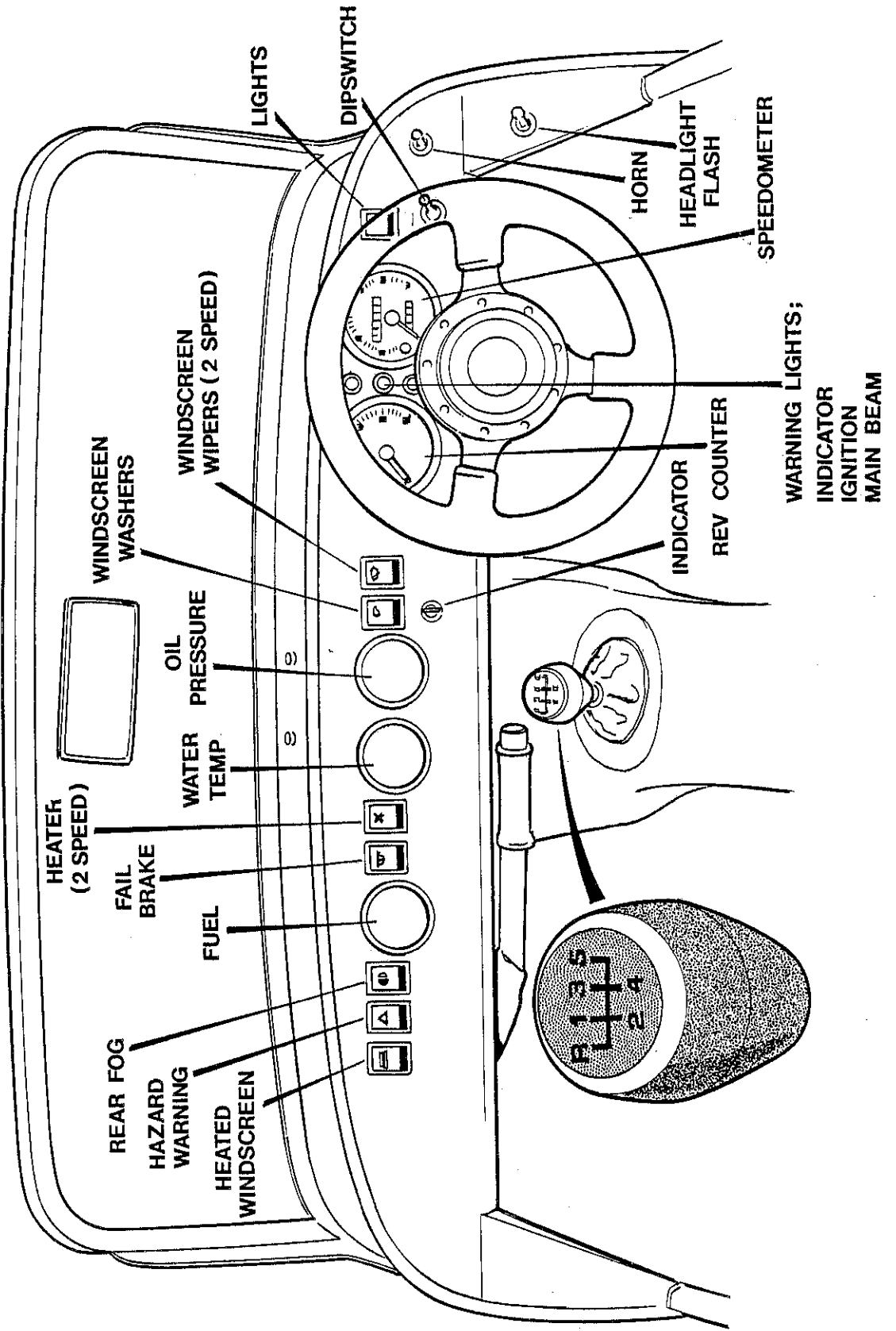


Fig. 17.6

# FINAL CHECKS AND SERVICE INFORMATION

## CATERHAM SUPER SEVEN MODELS

### POST BUILD CHECK

#### LUBRICATION

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

#### ENGINE

- 2) Check hose connections and radiator level.
- 3) Check security of engine mountings and exhaust system.

#### CLUTCH

- 4) Check correct adjustment and operation of clutch.

#### BRAKES

- 5) Check braking system for operation and correct adjustment.
- 6) Check brake hydraulic lines for security and leaks.
- 7) Check brake fluid reservoir level.

#### STEERING AND SUSPENSION

- 8) Check all front and rear mounting bolts for tightness.
- 9) Check tyre pressures and tightness of wheel nuts.
- 10) Check security of all steering connections.
- 11) Check that steering rack mountings are secure.
- 12) Check front wheel alignment.

#### ELECTRICAL SYSTEM

- 13) Check headlamp adjustment.
- 14) Check operation of all circuits.
- 15) Check that battery and terminals are secure.

#### BODY

- 16) Check weather equipment.
- 17) Check security of front and rear wings.

#### GENERAL

- 18) Road test and report on any defects found.

## FINAL CHECKS AND SERVICE INFORMATION

### CATERHAM SUPER SEVEN MODELS

#### INITIAL SERVICE 500 MILES (800 Km)

##### LUBRICATION

- 1) Drain engine and refill with new oil. Top up gearbox and rear axle/differential. Check for oil leaks.
- 2) Grease or oil all lubrication points, as applicable.

##### ENGINE

- 3) Check cylinder head torque settings.
- 4) Check valve clearances.
- 5) Check all water hose connections and radiator level
- 6) Adjust spark plugs, contact breakers and reset ignition timing.
- 7) Check carburettor, balance slow running and mixture adjustments.
- 8) Check tightness of all manifolds, exhaust system, engine mountings and distributor fitting.

##### CLUTCH

- 9) Check correct adjustment and operation.

##### BRAKES

- 10) Check braking system for operation and correct adjustment.
- 11) Check braking system lines for security and leakage.
- 12) Check brake fluid reservoir level.

##### STEERING AND SUSPENSION

- 13) Check all front and rear suspension mounting bolts for tightness.
- 14) Check tyre pressures and tightness of wheel nuts.
- 15) Check that all steering connections are secure.
- 16) Check that steering rack mountings are secure.
- 17) Check front wheel alignment.

##### ELECTRICAL SYSTEM

- 18) Check headlamp adjustment.
- 19) Check operation of all circuits.
- 20) Check that battery and its connections are clean and secure.
- 21) Check condition of fuses.
- 22) Check alternator belt tension.

##### BODY

- 23) Check body condition overall and weather equipment.
- 24) Check security of front wing mounting bolts.
- 25) Road test.

## FINAL CHECKS AND SERVICE INFORMATION

### SERVICE SCHEDULES FOR CATERHAM SUPER SEVEN MODELS

- A EVERY 3000 MILES ( 5000 KM) or 3 MONTHS
- B EVERY 6000 MILES (10000 KM) or 6 MONTHS
- C EVERY 12000 MILES (20000 KM) or 12 MONTHS

A	B	C	OPERATION	X
X	X	X	Check condition and security of seat belts	
X	X	X	Check operation of lamps, horn, indicators and screen washers	
X	X	X	Check condition of screen wipers, renew as necessary	
X	X	X	Check security and operation of Handbrake lever	
X	X	X	Check/Top up Battery electrolyte (if applicable)	
X	X	X	Clean and grease Battery connections	
X	X	X	Check/Top up Windscreen Washer Reservoir	
X	X	X	Check/Top up Cooling system	
X	X	X	Check all water hoses for security and condition	
X	X	X	Check/Top up Brake fluid reservoir	
		X	Change Brake Fluid	
X	X	X	Check Alternator drive belt, adjust or renew	
	X	X	Check security/condition of ancillaries and exhaust system	
	X	X	Check/Adjust Valve clearances	
	X	X	Adjust Timing chain tension (Twin Cam only)	
	X		Clean/Adjust Spark Plugs	
	X		Renew Spark Plugs	
	X		Renew Contact Breakers, Lubricate Cam and Weights	
X			Adjust/Renew Contact Breakers, Lubricate Cam and Weights	
	X		Renew Paper Air Cleaner Element (Clean Gauze type)	
	X		Clean out Fuel Pump and filters	
	X		Clean/Fit new Crankcase ventilation valve (1600 GT only)	
X	X		Check/Adjust Ignition Timing/Distributor advance mechanism	
X	X	X	Check Carburettor security, balance and slow running, leakage	
X	X	X	Drain Engine Oil and Refill with new Oil	
	X	X	Fit new Engine Oil Filter, check for leaks	
X	X	X	Check and top up Gearbox and Rear Axle/Differential Oil	
X	X	X	Check condition of Tyres/Adjust Tyre pressures	
	X	X	Inspect Brake Pads for wear and condition of Discs	
	X		Check/Adjust Front Wheel Bearing End-Float	
	X		Re-Pack Front Wheel Bearings with Grease and adjust End-Float	
	X	X	Remove Brake Drums, Inspect Shoes/Drums for wear, wash out dust	
X	X	X	Adjust rear brakes (if appropriate), Lubricate/Adjust Handbrake	
	X	X	Check condition of Brake Hoses, pipes and unions	
X	X	X	Check and Adjust Clutch Mechanism	
	X	X	Check condition of Steering joints/gaiters lubricate Trunnions	
	X		Lubricate Steering Rack and Pinion	
X	X	X	Check Tightness of Road Wheels	
	X		Check Security and Tightness of Suspension fixings	
X	X	X	Check condition of rear "A" Frame Bushes	
	X		Grease Propeller Shaft (if appropriate)	
	X	X	Check/Adjust Headlamp Alignment	
	X	X	Check/Adjust Front Wheel Alignment	
X	X	X	Carry out Road Test, Report on Defects/Additional Work needed	
X	X	X	Check Cleanliness of Controls, Steering wheel, etc	

# FINAL CHECKS AND SERVICE INFORMATION

## LAYOUT OF FUSE BOX

Brake Lights 10	Heater 10	Wipers 15	Radiator Fan 15
Heated Screen 10	Horn 20	Indicator Hazards 10	Dim/Dip 15
Dip Beam 15	Main Beam 15	LH Side Lights 5	RH Side Lights & Inst. 7.5
HORN		HAZARD	
FLASHER UNIT		DIM/DIP	

## 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



# FINAL CHECKS AND SERVICE INFORMATION

## KEY TO WIRING DIAGRAM

1	LH Rear Indicator	30	Ignition Warning Light
2	LH Rear Light	31	Indicator Light
3	LH Rear Brake Light	32	Speedometer
4	Reversing Light	33	Lights Switch
5	Fog Light	34	Dip Switch
6	Number Plate Light	35	Flash Switch
7	RH Rear Brake Light	36	Horn
8	RH Rear Light	37	Heated Front Screen
9	RH Rear Indicator	38	Indicator Switch
10	Dim Dip Control	39	Coil
11	Heated Screen Switch	40	Distributor
12	Hazard Switch	41	Ignition Amplifier
13	Rear Fog Switch	42	Ignition Switch
14	Fuel Guage	43	(a) Electric Horns
15	Fuel Level Sender Unit		(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 2 Speed	47	LH Main Beam
	GY Slow	48	RH Side Light
	GS Fast	49	RH Dipped Beam
20	Water Temperature Guage	50	RH Main Beam
21	Water Temperature Sensor	51	LH Front Indicator
22	Oil Pressure Guage	52	Radiator Fan
23	Oil Pressure Sensor	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		
29	Main Beam Light		

## ENGINE KIT ASSEMBLY

Two engine kits are offered, 1600 Sprint and 1700 Supersprint, full specifications for each may be found at the rear of this section. Engines are supplied "undressed" but with all internal preparation completed, therefore the contents of this section is limited to the fitment of the external ancillaries.

The engines available are identical in specification to those supplied in our component cars and are therefore well tried and tested. If properly maintained, either engine is capable of many miles reliable use and consistent performance.

For information, a list of torque settings for attaching the ancillaries is given at the rear of this section and this should be referred to throughout assembly to ensure reliability. You should note that all fasteners which screw into the engine block are UNC type.

### 18.1 Fitment of Oil Sender Unit.

This is fitted towards the front of the right hand side of the cylinder block as viewed from the rear of the car. PTFE tape should be applied to the thread of the sender in order to ensure a perfect oil tight seal. However, do not allow any tape to exceed the length of the shank so as to prevent the possibility

## ENGINE KIT ASSEMBLY

of blockage of the pin hole in the end. Do not use mole grips on the main body of the sender as this will damage the unit. Only use the correct 17mm spanner on the hexagonal section.

### 18.2 Fitment of Fuel Pump.

The fuel pump is mounted onto the right hand side of the cylinder block via a gasket and mounting block. Sparing application of a sealant such as Blue Hylomar to the gasket and mounting block surfaces is recommended. Ensure that the pump rotor arm is correctly positioned on top of the camshaft eccentric. Torque up the two 5/16" x 1.1/8" UNC bolts to 12-15 lb.ft.

### 18.3 Breather Valve

Ensure that the engine breather valve has been removed from the breather hose. Pull out with pliers if necessary.

### 18.4 Fitment of Water Pump and Pulley.

Fit the water pump to the front face of the cylinder block using the appropriate gasket. Application of a gasket sealant such as Clearseal is advisable. The alternator adjusting strap should be fitted to the water pump housing at this point. Torque up the three locating setscrews.

Now fit the water pump pulley using the four 8mm x 16mm setscrews torqued to 10-12 lb.ft.

## ENGINE KIT ASSEMBLY

If a heater is to be fitted the straight union should be fitted to the water pump. To prevent chaffing of the heater hose which attaches to this union, it is recommended that the sharp edge of the cylinder head be ground to a generous radius using a small file, or alternatively the hose should be sleeved with a larger diameter piece of hose at the fitting stage..

### 18.5 Fitment of Alternator.

Fit the alternator bracket to the front left hand side of the cylinder block using two 3/8" UNC x 1" setscrews and spring washers. Then mount the alternator onto the bracket using the 5/16" UNF x 1.3/4" bolt and nyloc nut at the front mounting point. Ensure that the crankshaft, water pump and alternator pulleys are in line. This may require the alternator to be shimmed using washer(s) to achieve good alignment. The rear alternator mounting takes a 5/16" UNF x 1.3/8" bolt and nyloc nut.

An 8mm x 25mm setscrew is used to fix the alternator to the adjusting strap. With the fan belt in place over the crankshaft, water pump and alternator pulleys, adjust the tension by sliding the alternator away from the block until there is approximately 1/2" (13mm) vertical slack in the belt between the alternator and the water pump. Set this tension by tightening the alternator mounting bolts taking particular care not to overtighten the 8mm setscrew fixing the top bracket.

## ENGINE KIT ASSEMBLY

### 18.6 Fitment of Flywheel.

The flywheel is supplied in a protective coating which should be removed using petrol or thinners particularly from the clutch friction plate mating surface on its rear face.

Fit the three clutch cover locating dowels into the flywheel using a ball peen hammer. Check that the flywheel and crankshaft boss surfaces are smooth and burr free. Trial fit the flywheel and ensure that rotation is true. If it is not, consult the factory.

Mount the flywheel using the six special bolts supplied ensuring that these bolts are torqued up to 50 - 56 lb.ft. It is recommended that "Loctite" be applied to prevent these from working loose.

Grease the spigot bearing at the rear of the crankshaft.

### 18.7 Fitment of Clutch disc and cover plate.

With the clutch disc in place and facing the correct way (clearly marked) locate the clutch cover plate on the three dowels. (Use the mating marks provided for alignment)

Clutch disc alignment is achieved by screwing the six 5/16" UNC x 3/4" setscrews (with spring washers) into the flywheel, finger tight. The clutch disc is ideally aligned using a clutch aligning tool which should be readily available for hire locally from either a car accessory shop or garage. Alternatively, alignment may be accomplished by an expert eye, but we do not

## ENGINE KIT ASSEMBLY

recommend using the gearbox for this purpose since it is heavy and may easily be dropped and its casing damaged or its input shaft bent.

### 10.8 Distributor Fitment and Timing.

The distributor is fitted to the right hand side of the cylinder block and is supplied with a side entry cap in addition to the cap fitted as standard in order to clear the inlet manifold. Discard the standard cap.

If electronic ignition is to be fitted, the distributor ignition should be completed first using the Lucas instructions.

It should be noted that the main vehicle loom includes the wiring from both the coil to the electronic ignition module and to the distributor. Hence, the loom supplied in the Lucas pack may be discarded as well.

Rotate the crankshaft until No.1 piston is rising on compression (This can be checked by turning the engine over by hand with the plugs removed and a suitable finger in No.1, the front, plug hole). Turn until the notch on the crankshaft pulley is lined up half way between the  $8^{\circ}$  and  $12^{\circ}$  marks on the timing cover. ( $10^{\circ}$  BTDC).

Fit the "O" ring oil seal to the distributor stem. Viewing the engine from the right hand (inlet) side, insert the distributor so that the HT (high tension) lead sockets point back toward the flywheel at  $15^{\circ}$  below the horizontal (8 o'clock). The rotor arm

## ENGINE KIT ASSEMBLY

should point forwards toward the water pump at an angle  $15^{\circ}$  above the horizontal (2 o'clock).

Time the engine as suggested in the Lucas instruction sheet if electronic ignition is fitted. If contact breakers are fitted the timing may be done statically using a test bulb connected between the distributor LT (low tension) terminal and earth. Alternatively a stroboscope may be used to give a more accurate setting. Note: static timing for both engines is  $10^{\circ}$  BTDC.

Once the timing is satisfactory ensure that the distributor body clamp is tight. Fit the HT leads to the distributor cap noting that the plug lead sockets are numbered from top to bottom on the cap in the order 4 2 1 3.

### WARNING

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

### 18.9 Fitment of Inlet Manifold.

The inlet manifold fits to the right hand side of the engine and is secured by 4 setscrews and 1 stud and nut. Before it is fitted we suggest that you trim the rocker gasket tabs protruding above the manifold face as these may foul the manifold.

## ENGINE KIT ASSEMBLY

The manifold casting is a special item designed specifically for fitting Weber DCOE carburetors to a Seven. Before it is fitted check that there is no sand or swarf inside the ports and if so clean out with emery cloth. Sand particles digested by the engine will cause premature wear.

In the top of the manifold casting is a hole to take the heater elbow, and this should be fitted prior to attaching it to the engine. This elbow should be tightened so as to leave its outlet facing rearwards.

To facilitate removal of the inlet manifold at a later stage a 5/16" stud, as used to fasten the carburetors to the manifold, should be screwed into the central hole in the manifold flat of the head, using some PTFE tape to assist with sealing.

Fit the inlet manifold and gasket using four 5/16" UNC x 1.1/8" setscrews. Remember to sparingly apply some instant gasket around the central waterway. In addition, ensure that the dipstick tube bracket is secured to the rearmost screw of the manifold, this may require some manipulation of the bracket. Torque up the setscrews to 13 - 15 lb.ft. and use a full nyloc nut and several washers on the central stud.

Finally insert 8 x 5/16" studs into the outer face of the manifold and use Loctite to prevent them loosening in service.

### 18.10 Fitment of Carburetors.

The carburetors should be joined prior to fitting to the



## ENGINE KIT ASSEMBLY

manifold. This is achieved using the black tubular throttle cable bracket which should be affixed to the bottoms of the carburetors, spring hole uppermost, using the existing screws .

Fit the throttle return spring supplied. This operation requires bending of the top of the spring to form a neat "U" hook. It is very important that you do this to ensure that the throttle spring does not catch on the carburetor bodies and therefore jam open the throttle. In addition it is advisable to grind away the two lower throttle idle stops to further decrease the risk of throttle sticking.

The carburetors can now be fitted. Ensure that the four sandwich plates are in position between the carburetors and manifold. Fit the carburetors using captive washers to hold a vibration grommet and secure using 5/16" half nyloc UNF nuts. To attain good vibration resistance the gap between the captive washers should be 0.025" (0.64mm).

### 18.11 Final Assembly.

Fit the fuel hose from the fuel pump to the carburetors, using either the monoclamps or jubilee clips provided. The monoclamps provide the better security but require a good pair of pinchers to fit them. Use the jubilee clips if you cannot fit the monoclamps.

The dipstick supplied must be re-graduated to give accurate oil level measurement. This is done by taking the "I" of MIN to be the full level mark. The M and N may be filed away to avoid

## ENGINE KIT ASSEMBLY

confusion.

Air filters should be fitted once the engine is in the car. Remember to fit the paper filters between the carburettors and filter backplates.

### 18.12 Adjustment of the Weber Carburettors.

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 coupling screw) and the four idling mixture volume adjustment screws (or mixture screws). See figure 18.12 at rear of section for clarification.

The carburettors should be "set-up" after initial installation or subsequent overhaul 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 1,000 r.p.m.
- E. Synchronise 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 the

## ENGINE KIT ASSEMBLY

factory at a cost of £29.22 (August '88) part number 98001.000 - adjust the coupling screw until the air flow through each carburettor is the same.

Alternatively, a piece of rubber or plastic tube can be used; one end being held to the ear and the other at the mouth of the carburettor trumpet. The coupling screw is then adjusted to produce the same loudness of "hiss" at each carburettor.

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 throttle screw from time to time to maintain the engine revolutions at around 1,000 r.p.m.

G. Repeat D, E and F (possibly several times) until no further improvements can be obtained.

H. Adjust the throttle screw to give an idle of 900 to 950 r.p.m.

# ENGINE KIT ASSEMBLY

## TORQUE WRENCH SETTINGS - KENT ENGINES

		<u>lb f ft</u>	<u>Kg f m</u>
MAIN BEARING COVER	-	55 to 60	7.5 to 8.2
CONNECTING ROD BOLTS	-	31 to 35	4.2 to 4.8
CRANKSHAFT BELT PULLEY	-	24 to 28	3.3 to 3.8
CAMSHAFT CHAIN SPROCKET	-	13 to 15	1.7 to 2.1
REAR SEALING RING CARRIER	-	13 to 15	1.7 to 2.1
FLYWHEEL	-	50 to 56	6.8 to 7.6
CLUTCH THRUST PLATE TO FLYWHEEL	-	13 to 15	1.7 to 2.1
FRONT CRANKSHAFT COVER	-	5 to 7	0.7 to 1.0
OIL PUMP	-	13 to 15	1.7 to 2.1
OIL PUMP INLET PIPE	-	13 to 15	1.7 to 2.1
OIL PUMP COVER	-	5 to 7	0.7 to 1.0
ROCKER SHAFT	-	18 to 22	2.4 to 3.0
CYLINDER HEAD (in sequence):			
(1)	-	5	0.7
(2)	-	20 to 31	2.8 to 4.2
(3)	-	52 to 56	7.0 to 7.6
(4) after 10 - 20 minutes wait	-	66 to 71	9.0 to 9.7
(5) after engine warmed up (15 mins at 1000rpm) tighten up	-	66 to 71	9.0 to 9.7
ROCKER COVER	-	3 to 4	0.35 to 0.5
SUMP (in sequence):			
(1)	-	3 to 5	0.4 to 0.7
(2)	-	6 to 8	0.8 to 1.1
OIL DRAIN SCREW	-	20 to 25	2.7 to 3.4
OIL PRESSURE SWITCH	-	10 to 11	1.3 to 1.5
SPARK PLUGS	-	22 to 29	3.0 to 3.9
INLET MANIFOLD	-	13 to 15	1.7 to 2.1
EXHAUST MANIFOLD	-	15 to 18	2.1 to 2.5
FUEL PUMP	-	12 to 15	1.63 to 2.03
WATER PUMP	-	5 to 7	0.7 to 1.0
THERMOSTAT HOUSING	-	13 to 15	1.7 to 2.1
FAN TO WATER PUMP FLANGE	-	5 to 7	0.7 to 1.0
TIMING CHAIN TENSIONER	-	5 to 7	0.7 to 1.0

# ENGINE KIT ASSEMBLY

## 1600 SRINT SPORTS ENGINE SPECIFICATION

### BASE UNIT

Ford o.h.v. 2265E "Kent" crossflow

### BORE

80.98mm

### STROKE

77.62mm

### CAPACITY

1599cc

### COMPRESSION RATIO

9.0 : 1

### CYLINDER HEAD

Gas flowed with enlarged ports

### CAMSHAFT

A2 Profile

### FLYWHEEL

Lightened and balanced

### CLUTCH

Upated competition cover assembly and drive plate

### IGNITION

Bosch distributor with special side entry cap with optional Lucas electronic ignition. NGK BP7ES spark plugs

### VALVE COVER

Caterham cast alloy with "SUPER 7 SPRINT" script

### LUBRICATION

High pressure oil pump with standard wet sump

### INLET MANIFOLD

Caterham cast alloy

### CARBURATION

Two Weber 40DCOE 151

### AIR FILTRATION

Two K & N high performance filters

### PERFORMANCE DATA

Maximum power 110 B.H.P. (80.9 KW) at 6,000 rpm

Maximum torque 105.5 lb/ft (14.6 MKG) at 4,800 rpm

### SERVICING DATA

Static ignition timing

10° B.T.D.C.

Valve clearances (cold)

Inlet 0.020" Exhaust 0.022"

Spark plug type

NGK BP7ES

Spark plug gap

0.025"

Firing order

1-2-4-3

Fuel

97 Octane (4 Star) Leaded

Oil pressure (normal temp)

3-4 B.A.R.

## ENGINE KIT ASSEMBLY

### 1700 SUPERSPRINT ENGINE SPECIFICATION

#### BASE UNIT

Ford o.h.v. 2265E "Kent" crossflow

#### BORE

83.27mm

#### STROKE

77.62mm

#### CAPACITY

1690cc

#### COMPRESSION RATIO

9.75 : 1

#### CYLINDER HEAD

Gas flowed and enlarged ports

#### VALVES

Oversize, gas flowed design manufactured in 21-4N steel

#### VALVE SPRINGS

Heavy duty, Duplex with retainers to suit

#### CAMSHAFT

Caterham BCD, with high lift, short duration profile

#### PISTONS

Cast aluminium modified to give valve to piston clearance

#### CRANKSHAFT BEARINGS

Upated competition type main and big end shell bearings

#### FLYWHEEL

Lightened and balanced

#### CLUTCH

Upated competition cover assembly and drive plate

#### IGNITION

Bosch distributor with special side entry cap with optional Lucas electronic ignition. NGK B8ECS Spark plugs

#### VALVE COVER

Caterham cast alloy with "1700 SUPERSPRINT" script

#### LUBRICATION

High pressure oil pump with standard wet sump

#### INLET MANIFOLD

Caterham cast alloy

#### CARBURATION

Two Weber 40 DCOE 151

#### AIR FILTRATION

Two K & N high performance air filters

## ENGINE KIT ASSEMBLY

### PERFORMANCE DATA

Maximum power 135 B.H.P. (99 KW) at 6,000 rpm  
Maximum torque 122 lb/ft at 4,500 rpm

### SERVICING DATA

Static ignition timing	10° B.T.D.C.
Valve clearances (cold)	Inlet 0.022" Exhaust 0.024"
Spark plug type	NGK B8ECS
Spark plug gap	0.025"
Firing order	1-2-4-3
Fuel	97 Octane (4 Star) Leaded
Oil pressure (normal temp)	3-4 B.A.R.

Inlet 0.0219  
Exhaust 0.0108  
Plug Gap 0.064  
14° BTDC UNLEADED

CARBURETTOR ADJUSTMENT SCREWS

WEBER 40 DCOE 151

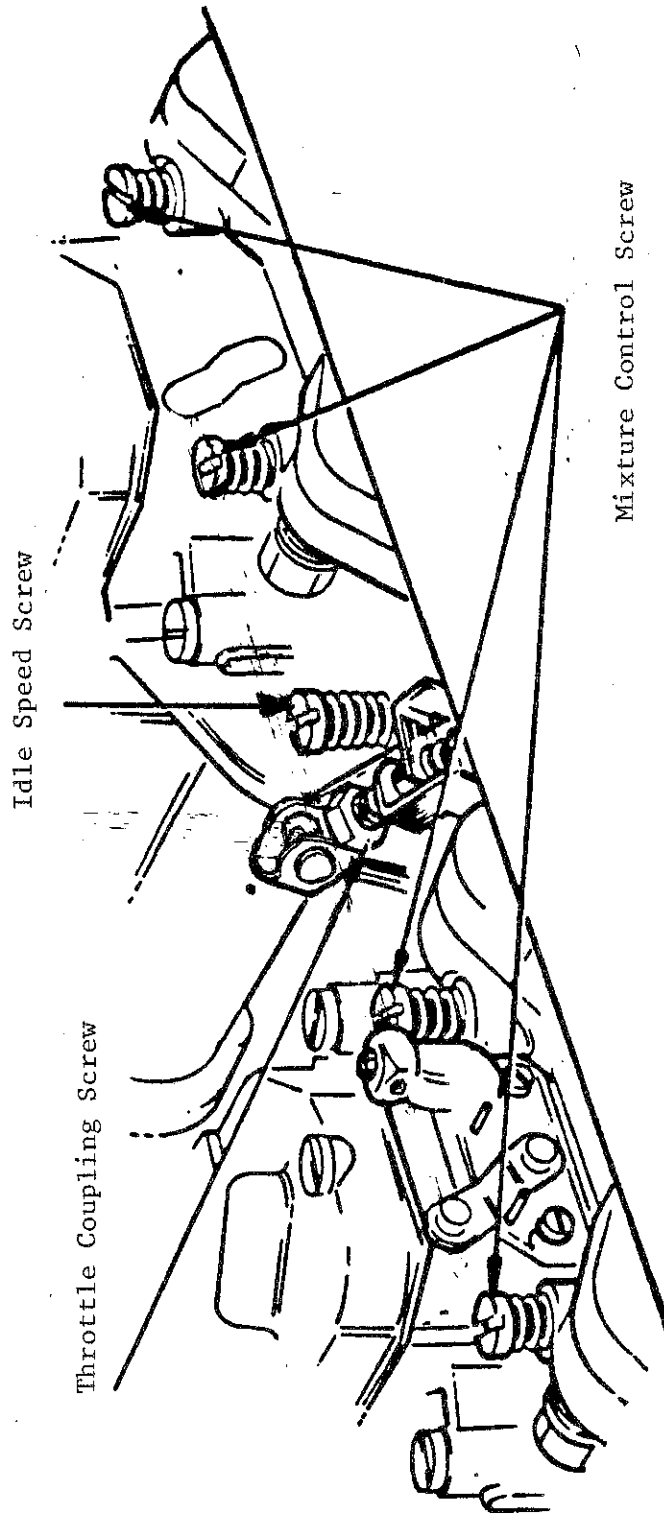


Fig. 18.12



# INDEX TO COMPONENTS

ITEM	SECTION	PAGE	REFERENCE
'A' Frame (live axle)	8	4	3.5
'A' Frame (De Dion)	7	7	4.5
Aeroquip	9	2	1.4
Alternator	10	13	7.1
(fitting)	18	3	5.0
Anti-roll bar (front)	5	1,2	1.4,2.3
Anti-roll bar (rear)	14	13	11.1
Axle Live (sourcing)	2	3	
(modification)	2	5	
and	8	1	8.1
(fitting)	8	2	2.1
(baffling)	16	13	4.5
BARC	16	3	1.2
BRSCC	16	3	1.2
Bearings, wheel (front)	4	4	5.2
(rear)	7	3	3.3
Boot floor	12	1	1.1
Boot cover	14	3	1.2
Brake pipes (De Dion)	7	8	5.1
(live axle)	8	2	2.1
Brake hoses (front)	9	2	1.1
(rear)	9	3	1.6
Brake fluid	9	4	1.7
Brake bleeding	9	4	1.7
Brake pads	4	6	6.3
Caliper (front)	4	6	6.2
Carpeting	12	1	2.1
Carburettor (fitting)	18	7	10.0
(tuning)	12	9	12.0
Chapman Colin	1	3	
Chassis (ordering)	2	1	
Cibie headlamps	14	3	2.0
Clutch cable	10	3	1.7
Clutch adjustment	10	7	3.4
Clutch fitting	18	4	7.0
Coil	9	10	4.5
Cooling system	10	10	6.1
Contents kits	2	rear of section	
Cycle wings	4	4	4.3

# INDEX TO COMPONENTS

	SECTION	PAGE	REFERENCE
Dampers (rear De Dion)	7	7	4.1
(rear live axle)	8	4	3.1
Dampers (adjustable abutment)	16	12	4.2
De Dion tube	7	3	3.1
Differential	7	1	2.1
Discs (rear)	7	5	3.7
Distributor	10	14	7.6
(fitting and timing)	18	5	8.0
Easibleed kit	9	4	1.7
Engine ordering	2	1	
Engine kits	18		
Engine specifications	18	12,13	
Engine installation DD 5 speed	10	5	3.1
DD 4 speed	10	9	5.1
LA 4 speed	10	8	4.1
Exhaust	10	16	8.1
Exhaust BDR (competition)	14	6	6.0
Fan switch	10	14	2.4
Fire extinguisher	16	8	2.5
Fireproofing (rear boot)	16	7	2.3
Fog lights rear	11	4	3.1
Fuel filler	9	10	4.4
Fuel pump	18	2	2.0
Gearbox specification	2	3	
Gearbox 5 speed	10	1	1.1
4 speed	10	3	2.1
Grille radiator	9	11	5.2
Handbrake cable (De Dion)	7	9	5.4
	7	10	5.6
(live axle)	8	3	2.3
Handbrake lever	9	5	2.1
Handbrake installation (De Dion)	9	5	2.1
(live axle)	9	7	3.2
Handbrake adjustment (De Dion)	9	6	2.4
(live axle)	9	7	3.3
Hardware definitions	2	3	
Headlamps	11	5	6.1
Heater	14	1	1.1
Hood fitting	13	1	1.1
erection	13	7	5.1
folding	13	8	5.2
increased visibility	13	7	4.6
Horn	8	8	4.2
Horn air	14	8	7.1
Hub (front)	4	4	5.0

# INDEX TO COMPONENTS

	SECTION	PAGE	REFERENCE
Ignition electronic	14	9	8.1
Indicators (front)	11	8	7.1
(repeaters)	11	5	5.1
Inspection service	17	4	3.0
Inlet manifold	18	6	9.0
Kits parts lists	2 rear of section		
Licence competition	16	2	1.1
Lights head	11	5	6.1
indicator front	11	8	7.1
indicator repeater	11	5	5.1
number plate	11	5	4.1
rear	11	1	1.1
rear fog	11	4	3.1
reversing	11	3	2.1
Lighting Legal requirements	11 rear of section		
Mirror rearview	9	11	5.4
Nearn Graham	1	3	
Negative camber wishbones	16	13	4.4
Oil	17	1	1.3
Oil cooler	14	3	4.1
Oil pressure switch	10	14	7.5
and	18	1	1.0
Painting	3	4	9.0
Pedal adjustment	17	2	2.1
Propshaft (De Dion)	7	1	2.3
(live axle)	10	8	4.1
Queries to Caterham	2	9	
RAC Motor Sports Association	16	2	1.1
Radiator	10	10	6.2
Radiator hoses	10	11	6.4
Radius rods (De Dion)	7	7	4.3
(live axle)	8	4	3.4
Registration	15	1	
Reverse gear stop	10	8	4.4
Reversing lights	11	3	2.1
Reversing light switch	10	2	1.5

## INDEX TO COMPONENTS

	SECTION	PAGE	REFERENCE
Rollover bar	16	6	2.1
Running in	17	5	4.0
Safety precautions	2	8	
Seating	12	4	3.2
Servicing	17	6	5.0
Seat belts	9	11	5.5
	12	4	3.1
	16	7	2.2
750 Motor Club	16	3	1.2
Side screens	13	5	4.1
Speedometer calibration	2	7	
drive gears	10	2	1.3
Starter (pre engaged)	10	13	7.2
(inertia)	10	15	7.9
Steering arms	4	3	4.2
column	6	1	2.1
rack	6	1	1.0
wheel	6	3	3.1
Stoneguards	14	5	5.0
Stub axle (front)	4	3	4.1
Temperature sensor	10	13	7.3
Tonneau cover	14	11	10.1
Torque settings	3	2	4.0
(engine)	18	11	
Track rod ends	6	3	3.2
Trunnions	4	1	2.0
Tyres	2	6	
Tyre pressures	17	1	1.1
Uprights (front)	4	2	3.0
Water pump	18	2	4.0
Windscreen washers	9	8	4.1
Wings fitting	9	12	5.6
Wing protectors	14	3	3.1
Wiring engine	10	12	7.0
Wiring diagram	17	rear of section	
Wishbone (front)	5	3	3.1
Wheels	2	6	

ISSUE DATE	MOD. NO.	ISSUE DATE	MOD. NO.

**TITLE**  
DRAWING NUMBER  
OC5 D01 A  
SUPER SEVEN SERIES III J7.N. 1988  
CATERHAM CAR SALES

**SCALE**  
COP. RIGHT

**NOTES**  
TOLERANCES UNLESS STATED  
LIMIT ±.05  
DIMENSIONS IN  
FINISH

ANGLE PROJECTION  
DRAWING NUMBER

