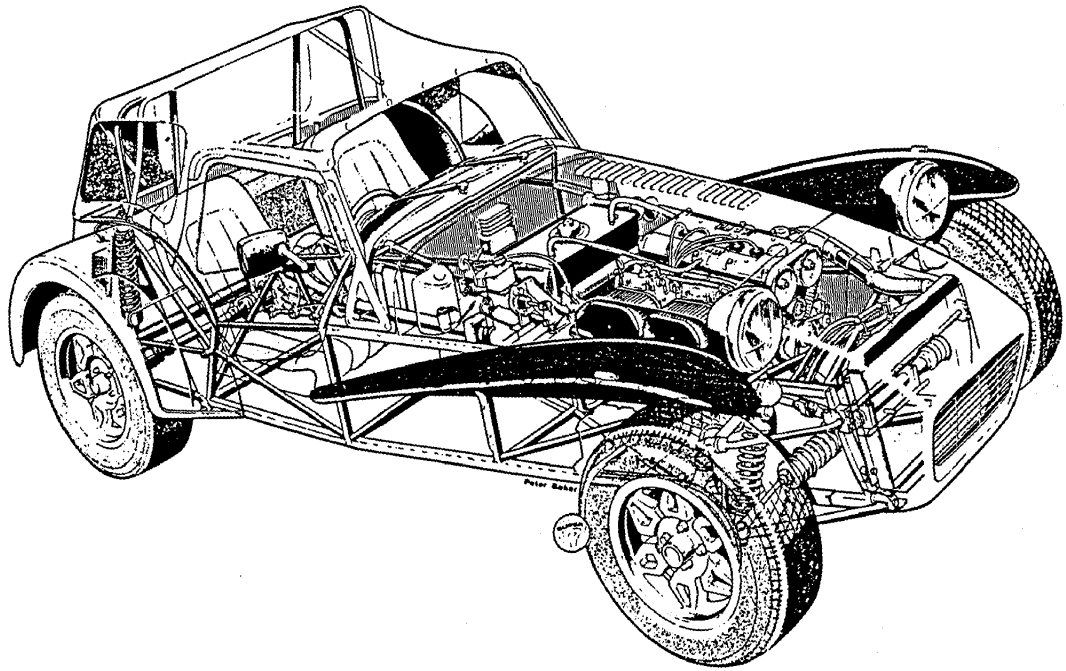




ASSEMBLY GUIDE

Caterham Car Sales
and Coachworks Ltd

CATERHAM
SUPER SEVEN®
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

0322 559124
032 559122

**CATERHAM
SUPER SEVEN**

KIT ASSEMBLY MANUAL

January 1992

LIST OF SECTIONS

1. Introduction to The Seven
2. Ordering Specification
3. Basic Assembly Hints
4. Assembly of Front Uprights
5. Assembly of Front Suspension Live Axle
- 5A. Assembly of Front Suspension De Dion
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
- 10A. Vauxhall Engine Installation
- 10B. Rover Engine Installation
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
18. Index

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.

The Series 2 introduced the 'A' frame rear suspension which is still

INTRODUCTION

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 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

INTRODUCTION

Graham Nearn, it would probably have been dropped as early as 1966. Seven production had continued erratically for some years, firstly at Lotus Components and then at Lotus Racing, which closed in 1971. Series 4s were manufactured in a corner of the main factory for a while, alongside Elans and Europas, before the impending launch of the new Elite, and increasing financial difficulties at Hethel finally spelt the end of the car.

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

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

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

Initially Caterham Sevens were fitted with Ford Escort axles, but supplies of this axle dried up in 1981 with the introduction of the FWD Mk III Escort. The replacement Morris Marina/Ital axle was fitted to approximately 500 Caterham Seven Series 3's between 1981

INTRODUCTION

and 1986 when it too ceased to be available. Seeing that the writing was on the wall for small beam axles, Caterham then designed their own De-Dion rear suspension, based on Ford Sierra parts, which was introduced in 1986. This in turn has seen further improvement with the fitment of rear disc brakes in 1989 along with a sealed pedal box and adjustable pedals.

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

By the mid eighties, supplies of Ford Escort Sport semi-close ratio gearboxes also dried up so the chassis was re-engineered to accept the 5-speed gearbox from the 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 loss of tractability.

INTRODUCTION

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

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

Completed cars were and are offered for overseas markets, but Caterham have traditionally sold cars in Component form, and latterly in Kit or CKD form also. All cars supplied to the UK market have to be completed by the customer to avoid the requirements of National Type Approval.

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 standards as those produced by Caterham Cars. For more experienced builders, this guide may be somewhat elementary in its detail. However, no doubt some sections will be helpful and we wish all our customers many hours of pleasure building a car that both they, and we at Caterham cars, 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 two forms to cater for the live axle and De Dion specifications. It is not possible to fit the De Dion assembly to a live axle chassis.

Engines

Caterham currently supply four engines as standard equipment; the Ford 2265E 1600cc overhead valve crossflow unit, in GT (1599cc 84 B.H.P.), Sprint (1599cc 110 B.H.P.) and Supersprint (1690cc 135 B.H.P.) tune, and the Vauxhall DOHC 16 valve unit in "HPC" specification (1998cc 175 B.H.P.) all of which run on unleaded 95 Octane fuel. Full specifications appear at the rear of this Section.

The Cosworth BDR and 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 on unleaded fuel. A tuning kit to this specification is available and further tuning is, of course, possible. We will be happy to supply advice, parts and engines complete with all ancillaries 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 pan' sump as fitted to an Escort 1600

ORDERING SPECIFICATION

or early Capri (1969 - 1972), along with appropriate pick-up pipe and dipstick. Since these items are becoming hard to obtain Caterham now manufacture a special sump for these engines designed to provide an optimum balance between ground clearance and oil capacity with adequate baffling for hard road or "road tyre" competition use.

Please note that if you wish to fit an oil cooler to a De Dion chassis a Capri type oil pump must be fitted to give sufficient clearance within the chassis.

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.

	Live Axle	De Dion		
	A	B	C	D
Engine	Ford OHV -	Ford OHV Cosworth BDR	Ford OHV Cosworth BDR	Vauxhall 16V
Gearbox	Ford Escort Sport Mk II	Ford Escort Sport Mk II	Ford Sierra XR4i 5 speed	Ford Sierra XR4i 5 speed
Axle	Morris Ital/ Marina	Caterham De Dion	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)

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

B) 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 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

ORDERING SPECIFICATION

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 ¹ / ₂ " 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
185/60 HR 14 Tyres
(De-Dion only) |
| iv) | 6 ¹ / ₂ x 15 Caterham
Seven Prisoner wheels | 195/50 VR 15 Tyres
(De-Dion only) |
| v) | 7" x 16" Caterham
Seven HPC wheels | 205/45 ZR 16 Tyres
(De Dion only) |

Caterham wheels have been specially designed and manufactured for the car and the 15" and 16" wheels are therefore of equivalent weight to split-rim racing wheels and much lighter than most aftermarket products. All wheels with the exception of alternative iv) should have 19mm inset or negative offset. These wider wheels have 13mm negative offset. Stud centres as follows:

Combination B, 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.
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ORDERING SPECIFICATION

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

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. NB: wheel/tyre options iii) and iv) have the same rolling radius therefore calibration is unaffected.

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.

ORDERING SPECIFICATION

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.

Clubman's CKD kits

It is possible to order a Caterham Seven kit in 5-Speed De Dion form complete with all components needed to complete your car including Engine, Gearbox, Wheels and Tyres. It is also possible to purchase an HPC specification car complete with all components except the basic Vauxhall engine. Components which should be specified at the time of ordering are as follows:

ENGINES (All running on unleaded fuel):

1600 GT	84 B.H.P.
1600 Sprint	110 B.H.P.
1700 Supersprint	135 B.H.P.
2000 Vauxhall HPC	175 B.H.P.

WHEELS and TYRES:

6" x 14 wheels	185/65	HR 14 Tyres
6 ¹ / ₂ " x 15 wheels	195/50	VR 15 Tyres
7" x 16 wheels	205/45	ZR 16 Tyres

C.K.D. kits are supplied with front uprights assembled and weather kit fitted so Sections 4 and 13 of this manual will not apply. Since a completed car will have been assembled from all new parts Caterham Cars will issue a "Certificate of Newness" enabling the owner to obtain a current registration prefix on payment of the appropriate Car Tax. This is covered under Section 15.

ORDERING SPECIFICATION

Caterham Cars Location

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

Andy Noble	(0322) 559124
Mike Dixon	(0322) 559124
Jez Coates	(0322) 559124

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

BASIC KIT

- 1 Chassis/Body unit
(fitted with wiring, instruments, switches, pedal box
brake master cylinder. steel brake pipes, petrol tank
and fuel line, windscreen and wiper motor assembly)
- 2 Windscreen wiper arms and blades
- 1 Battery clamp
- 1 Gearlever gaiter retaining ring (live axle only)
- 4 Wings (precoloured fibreglass)
- 2 Front upper wing stays

Front and rear wing piping and fixings

NB: Front and rear wings have been fitted at the
factory, but removed for ease of dispatch
- 1 Nosecone (precoloured fibreglass)
- 1 Bonnet lid (aluminium)

CYCLE WING KITS ONLY

- 2 Cycle wing stays
- 2 Headlamp brackets (in place of Front Wing Stays)

DE DION KITS ONLY

- 4 Aluminium seat spacers for fitment of adjustable seats
- 1 Pedal box sealing plate (front) with grommet
- 1 Pedal box sealing plate (rear) with grommet
- 1 Pedal box top plate (usually fitted)

FRONT UPRIGHT KIT

1 pair	Vertical links (uprights)	
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	3434
	De Dion Disc brakes	3441
	(All pads supplied are asbestos free)	
2	Brake discs	
1 pair	Trunnions (Live axle only)	
2 sets	Wheel bearings	
2	Grease caps	
2	Grease nipples (Live axle only)	
2	1/2" nyloc nuts	
4	7/16" x 1 ¹ / ₄ " bolts + spring washers (caliper to upright)	
8	3/8" x 1" bolts (hub to disc)	
2	red spacing washers	

FRONT SUSPENSION KIT

- 1 pair Wishbones fitted with bushes
(spherical joints pre-fitted on De Dion cars)
- 1 pair Top links fitted with bushes (live axle)
- 1 pair Top wishbones fitted with bushes and ball joints (De Dion)
- 1 Anti-roll bar
- 2 Anti-roll bar balls, studs and dust covers (De Dion)
- 4 Anti-roll bar mounting blocks (live axle)
- 2 Anti-roll bar mounting brackets & rubbers (De Dion)
- 4 5/16" x 2³/₄" bolts, nylocs and washers (live axle)
- 4 5/16" x 1¹/₂" bolts (De Dion)
- 2 Grease nipples (live axle)
- 2 Road springs (red flash De Dion, blue flash live axle)
- 2 Shock absorbers (adjustable seat option live axle only)
- 8 Y9 rubber flanged bushes (live axle only)
- 2 1/2" nylocs and washers (anti-roll bar live axle)
- 2 7/16" x 2¹/₂" bolts and nylocs (live axle)
- 2 5/16" x 1" bolts and washers (live axle)
- 2 1/2" x 3¹/₂" caphead bolts, half nylocs and washers
- 2 1/2" x 2¹/₂" bolts, nylocs and washers (live axle)
- 2 5/16" x 2³/₄" caphead bolts and sleeves (De Dion)
- 4 1/2" x 4" bolts, nylocs and washers (2 only live axle)
- 2 3/8" x 2" bolts, nylocs and washers (De Dion)

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 2³/₄" bolts, nylocs and washers
- 2 1/2" plain nuts
- 1 1/2" thin nyloc nut and washer
- 2 5/16" x 1³/₈" bolts and nylocs
- 2 Aluminium rack mounting spacers

DE DION AXLE KIT

1	De Dion tube with two aluminium end covers
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 calipers
2	Brake discs
8	3/8" x 5/8" crown head bolts
4	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 or De Dion "Z" arms
- 1 'A' frame
- 2 Road springs
- 2 Shock absorbers (adjustable seat option live axle only)
- 2 Y16 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 2¹/₂" x 1/2" bolt + nyloc
- 2 4" x 1/2" bolts, nylocs and washers (live axle)
- 2 5¹/₂" x 1/2" bolt, thin nyloc and washers (De Dion)
- 2 4¹/₂" x 1/2" bolts, nylocs and washers
- 2 3¹/₂" x 3/8" plated bolts, nylocs and washers
- 2 2¹/₂" x 1/2" bolts and lockwashers (De Dion)
- 1 Rear anti-roll bar assembly (De Dion only)
 - Comprising: 1 Rear anti-roll bar
 - 2 Anti-roll bar mountings
 - 2 Cotton reel rubbers
 - 4 1/4" x 3/4" bolts, nuts, washers
 - 2 Drop links
 - 2 Securing "V" bolts

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 lever cover and retaining circlip
- 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

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
- 1 Lower fan motor mounting bracket

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)

EXHAUST KIT VAUXHALL HPC

1	Exhaust manifold (4 primary pipes)
1	Collector
1	Under-car pipe set
1	Silencer box assembly
2	Silencer mounting bobbins
2	Exhaust clamps

LIGHTING KIT

- 2 Headlamp bowls
- 2 Headlamps
- 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 and connectors

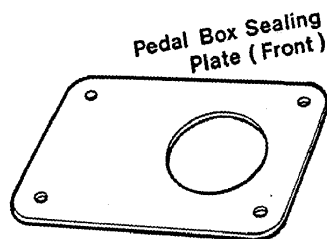
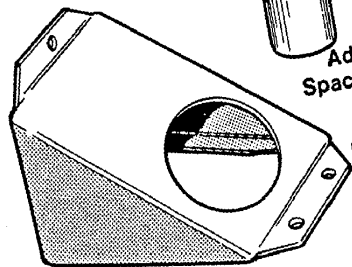
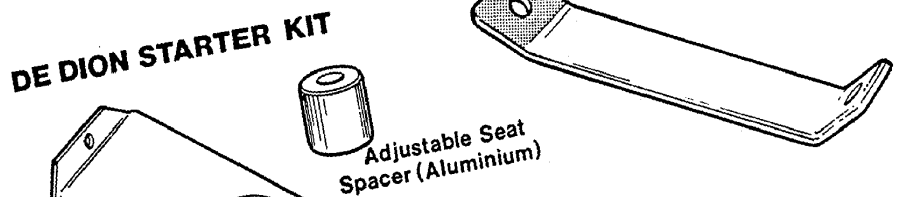
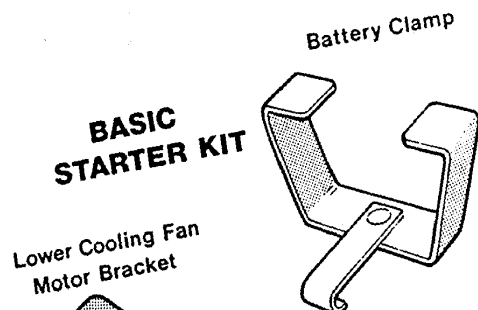
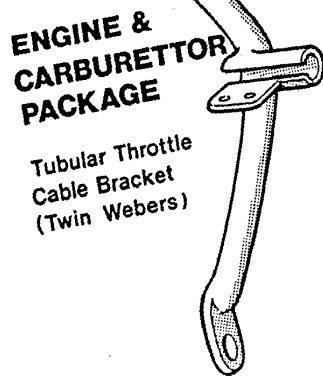
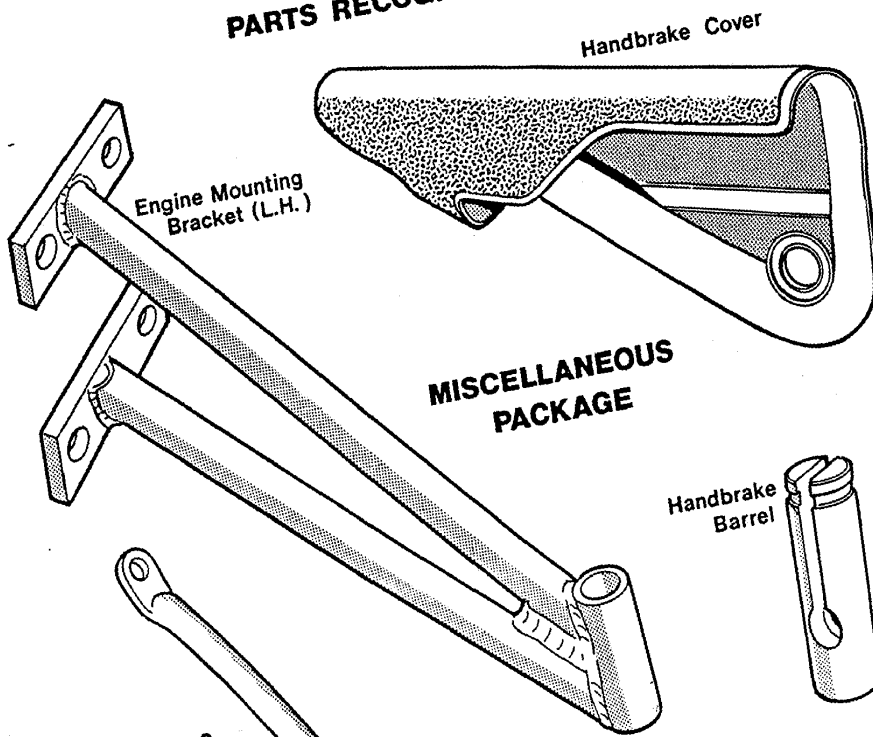
INTERIOR TRIM KIT

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

PARTS RECOGNITION SHEET



1600 GT 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

Standard

CAMSHAFT

Ford GT profile

FLYWHEEL

Standard

CLUTCH

Upated competition cover assembly and drive plate

IGNITION

Caterham distributor with optional Lucas electronic ignition

VALVE COVER

Standard pressed steel

LUBRICATION

Standard oil pump with standard wet sump

INLET MANIFOLD

Standard cast alloy

CARBURATION

Weber twin choke downdraft 32 DGAV 5E

AIR FILTRATION

Single foam pancake filter

PERFORMANCE DATA

Maximum power 84 B.H.P. (61.8 KW) at 5500 rpm

Maximum torque 91.8 lb/ft (12.7 MKG) at 3500 rpm

SERVICING DATA

- | | |
|----------------------------|-----------------------------|
| * Static ignition timing | 10 ⁰ B.T.D.C. |
| Valve clearances (hot) | Inlet 0.010" Exhaust 0.022" |
| Spark plug type | Motorcraft AGR 12 |
| 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. |
| Contact breaker points gap | 0.025" |

- * Engines numbered with the suffix "UL" can be run on unleaded 95 Octane fuel with static ignition timing of 14⁰ B.T.D.C.

1600 SPRINT 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

Up-rated competition cover assembly and drive plate

IGNITION

Caterham 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 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.
- Contact breaker points gap 0.025"
- * Engines numbered with the suffix "UL" can be run on unleaded 95 Octane fuel with static ignition timing of 14° B.T.D.C.

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

Caterham 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

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.
Contact breaker points gap	0.025"

Engines numbered with the suffix "UL" can be run on unleaded 95 Octane fuel with static ignition timing of 14° B.T.D.C.

2000 VAUXHALL ENGINE SPECIFICATION

<u>BORE</u>	86.00mm	<u>STROKE</u>	86.00mm
<u>CAPACITY</u>	1998cc	<u>COMPRESSION RATIO</u>	10.5 : 1

CYLINDER HEAD
Cosworth designed DOHC 4 valve per cylinder

CAMSHAFTS
Standard Vauxhall

FLYWHEEL
Standard Vauxhall

IGNITION
Caterham mapped ignition module

LUBRICATION
Caterham cast alloy wet sump. (optional Caterham cast alloy dry sump and bell tank housing)

CARBURATION
Two Weber 45 DCOE 152

AIR FILTRATION
Two K & N high performance filters

PERFORMANCE DATA
Maximum power 175 B.H.P. (130 KW) at 6750 rpm
Maximum torque 160 lb/ft (22.1 MKG) at 5000 rpm

SERVICING DATA

Ignition timing	No Adjustment Required
Valve clearances	Hydraulic Tappets
Spark plug type	90297152
Spark plug gap	0.025"
Firing order	1-3-4-2
Fuel	95 Octane Unleaded or Super-Unleaded
Oil pressure (normal temp)	3-4 B.A.R.
Contact breaker points gap	N/A Electronic ignition
Maximum engine speed	7500 rpm

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 2³/₄ is a UNF threaded bolt of 7/16" diameter and length 2³/₄"

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

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. The majority of fastenings are secured with the help of washers inserted between the nut or bolt head and the item to be secured. As a general rule particular washers are used in the following circumstances, otherwise washers should not be used:
 - a) To protect the surface and spread a load when attaching to a soft material such as glass fibre or aluminium use a plain washer.
 - b) To lock a thread where there is a possibility of the nut working loose use a spring washer, but not under a nyloc nut which serves a similar purpose.

BASIC ASSEMBLY

- c) To adjust the spacing of one component to another use plain washers of appropriate external diameter.
 - d) To spread a load onto very thin material use a large diameter thin plain washer.
 - e) To prevent the migration (sideways movement) of rubber bushes and to ensure that they fail safe if they totally disintegrate use a large plain washer, larger than the outside diameter of the bush, for example at the bottom of the rear dampers where they attach to the De Dion tube.
 - f) To present a uniform surface on which to tighten a fastening onto a rough or irregular surface use a plain washer.
 - g) To enable the use of a bolt smaller than the hole through which it passes use a plain washer sufficiently large.
6. In order to ensure ease of assembly and subsequent maintenance, we suggest the use of the following:
- a) Castrol IM 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.

Please note that all sealants should be applied very sparingly and the thinnest possible layer achieved, any excess should be

BASIC ASSEMBLY

wiped away immediately once the components are assembled.

7. 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.
8. 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.
9. The golden rule must be 'WHEN IN DOUBT, ASK'. Caterham Cars happily provide technical back up when required.
10. Basic starter kits as supplied by Caterham are unpainted, the bodywork being bare aluminium and the wings and nosecone pre-impregnated fibreglass.

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

BASIC ASSEMBLY

- 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)

11. 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.

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.

BASIC ASSEMBLY

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.

In addition, particular care should be taken to measure the bolts and fastenings before using them since it is quite possible to use an overlong bolt only to find that it is apparently "missing" later on when the only remaining bolts are too short. The instructions in each section detail the precise bolt sizes needed in each operation, and the kit listings at the rear of Section 2 again detail the fastenings provided in each kit.

You should be aware that Caterham Cars have a policy of continuous development and this means that the manual is revised 3 or 4 times per year to reflect the latest information. If you have taken your Assembly Guide at time of order it is possible that parts of it will be out of date by the time you receive your kit. Therefore should you find any discrepancies between the parts supplied and the description in this manual please consult the factory. We regret that it will not be possible to exchange old manuals for new ones.

BASIC ASSEMBLY

12. 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:

- a) Never work underneath a car without supporting it on axle stands or equivalent. Do not rely on a jack alone.
- b) The electric radiator cooling fan is controlled by a thermostat which operates when the ignition switch is in the on position. If you are working in the vicinity of the fan with a hot engine we recommend that the engine is switched off before starting work.
- c) Cars fitted with electronic ignition systems have much increased voltages compared with conventional systems and there is a real danger of electric shocks if you work on the system with the ignition on, particularly in damp conditions. The ignition should be switched off before touching any part of the ignition system.
- d) Engine Oils - Health Warning
 - i) Prolonged and repeated contact may cause serious skin disorders including dermatitis and skin cancer.
 - ii) Avoid contact with the skin as far as possible and wash thoroughly after any contact.
 - iii) Keep out of the reach of children.
 - iv) First aid treatment should be obtained immediately for open cuts and wounds.

BASIC ASSEMBLY

v) 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.

e) Used Engine Oils - Protect the Environment

It is illegal to pollute drains, water courses and soil. Use authorised waste collection facilities including civic amenity sites and garages providing facilities for the disposal of used oil and used oil filters. If in doubt contact your local authority for advice on disposal.

f) 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

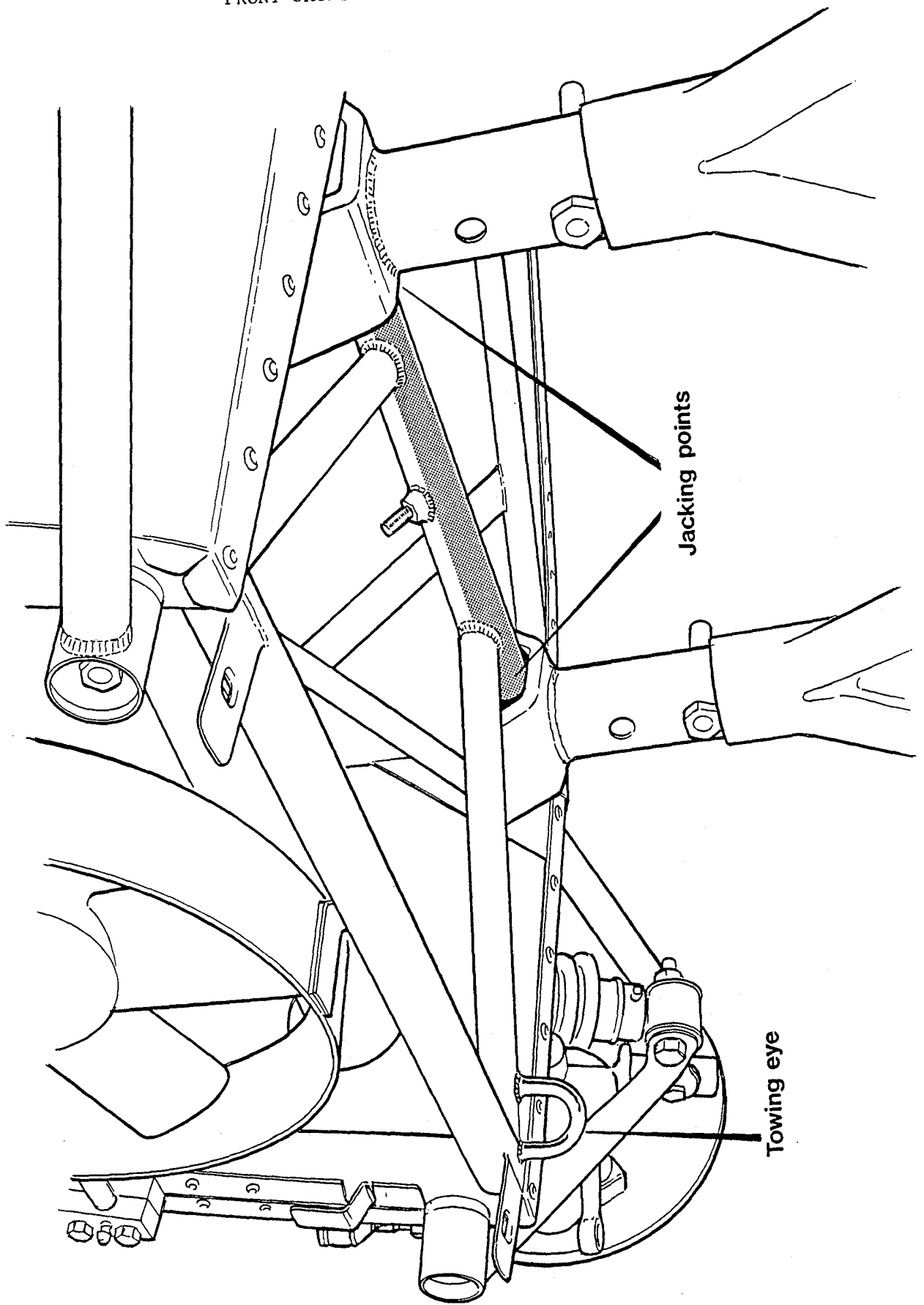


Fig. 3

ASSEMBLY OF FRONT UPRIGHTS

4.1 The front upright as fitted to live axle cars 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. De Dion uprights are unique to Caterham and sections 4.2 and 4.3 below referring to the trunnions do not apply.

4.2 The first step applicable to live axle cars only 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 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.

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

ASSEMBLY OF FRONT UPRIGHTS

When assembled, insert the grease nipple and tighten lightly using a 3/32" AF spanner. Fill the trunnion with more oil until it oozes around the seal once again. A good quality grease gun can be filled with oil for this purpose but do not use grease as this will go hard in service leading to premature wear of the trunnion.

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) 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 1⁷/₈" bolt and lock washer to attach the steering arm noting that to obtain the correct spacing one of the red washers supplied should be inserted between the upright and steering arm. The steering arm should face forward in a horizontal position.

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

ASSEMBLY OF FRONT UPRIGHTS

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 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

ASSEMBLY OF FRONT UPRIGHTS

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 1¹/₂" bolts. No washers should be fitted underneath the bolt heads. 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.

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

ASSEMBLY OF FRONT UPRIGHTS

either case the bleed nipple and flexible pipe input should be uppermost. These are secured using 7/16" x 1¹/₄" bolts which should be torqued up to 40-45 lb ft, with the pink spacing washers between the caliper and upright (see Fig.4.4.1. washer B) in order that the caliper is positioned correctly relative to the disc with equal spacing on each side. It is very important that you check that the four bolts holding the two halves of the caliper itself together are correctly tightened to 30 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 caliper) capturing both shims and pads, and are locked using the spring clips.

6.4 Repeat for the other side and leave in an upright position to prevent leakage of oil from the trunnions.

Front Trunnion

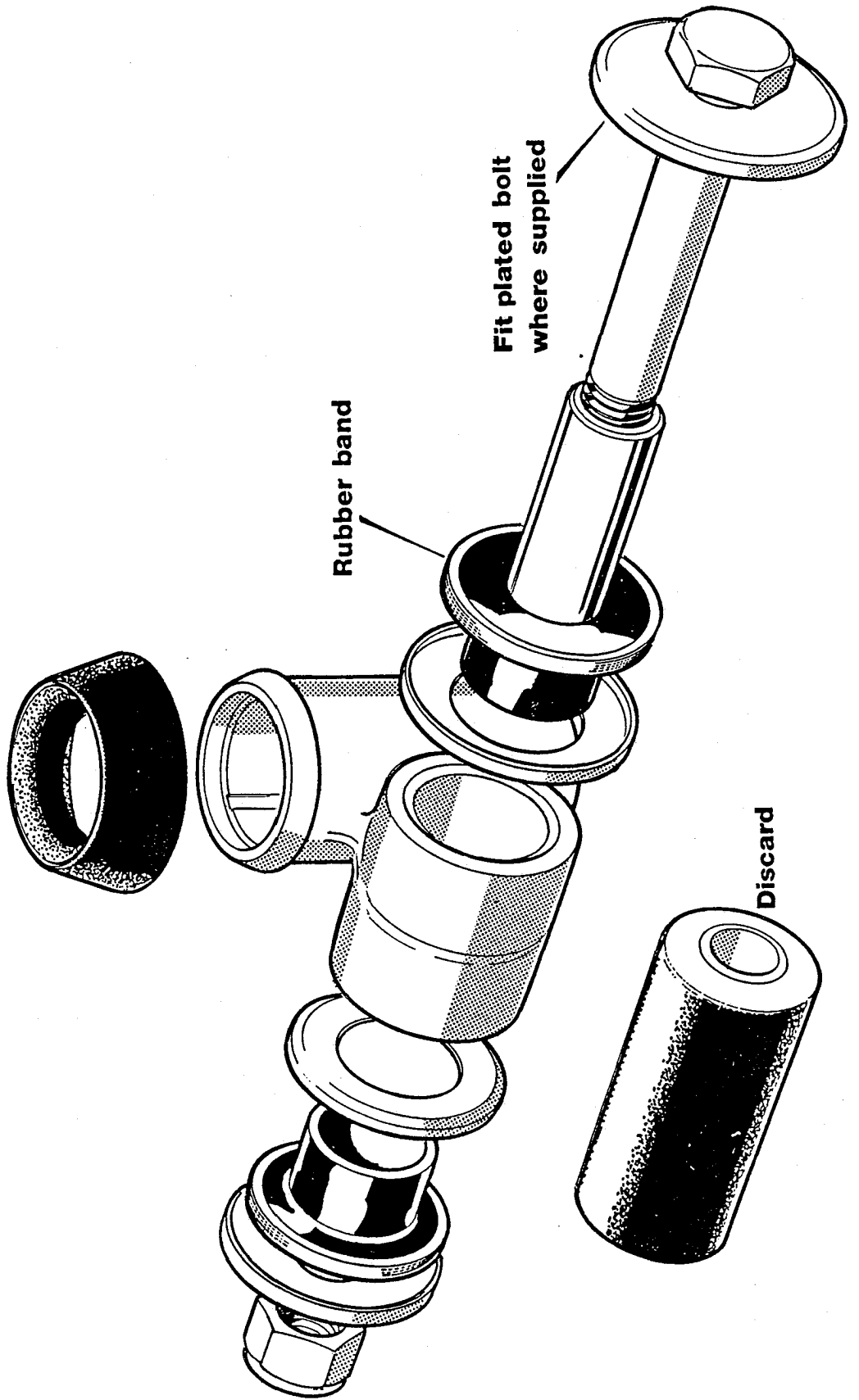


Fig. 4.2.1

Front Upright Assembly

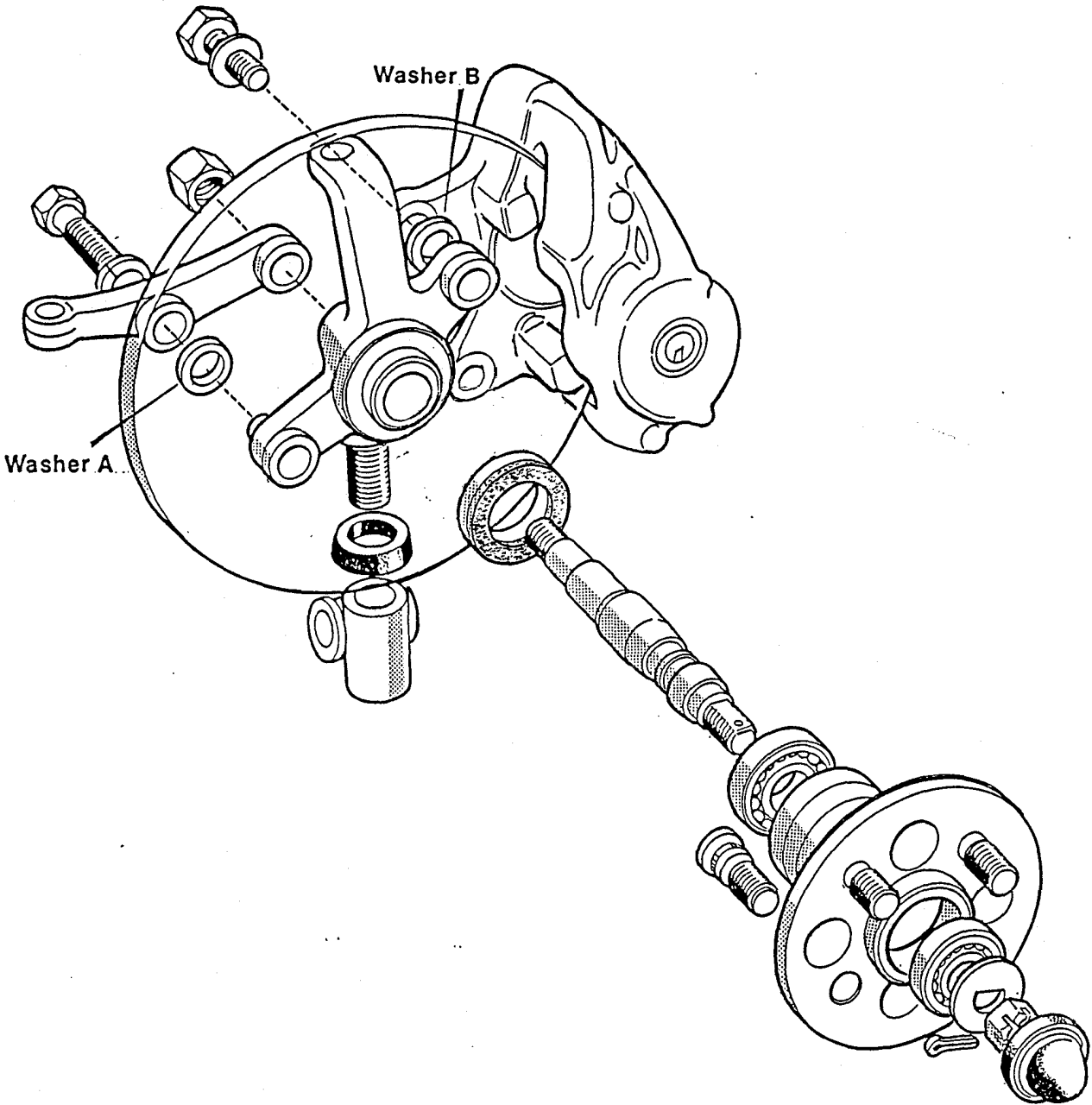


Fig. 4.4.1

Front Hub

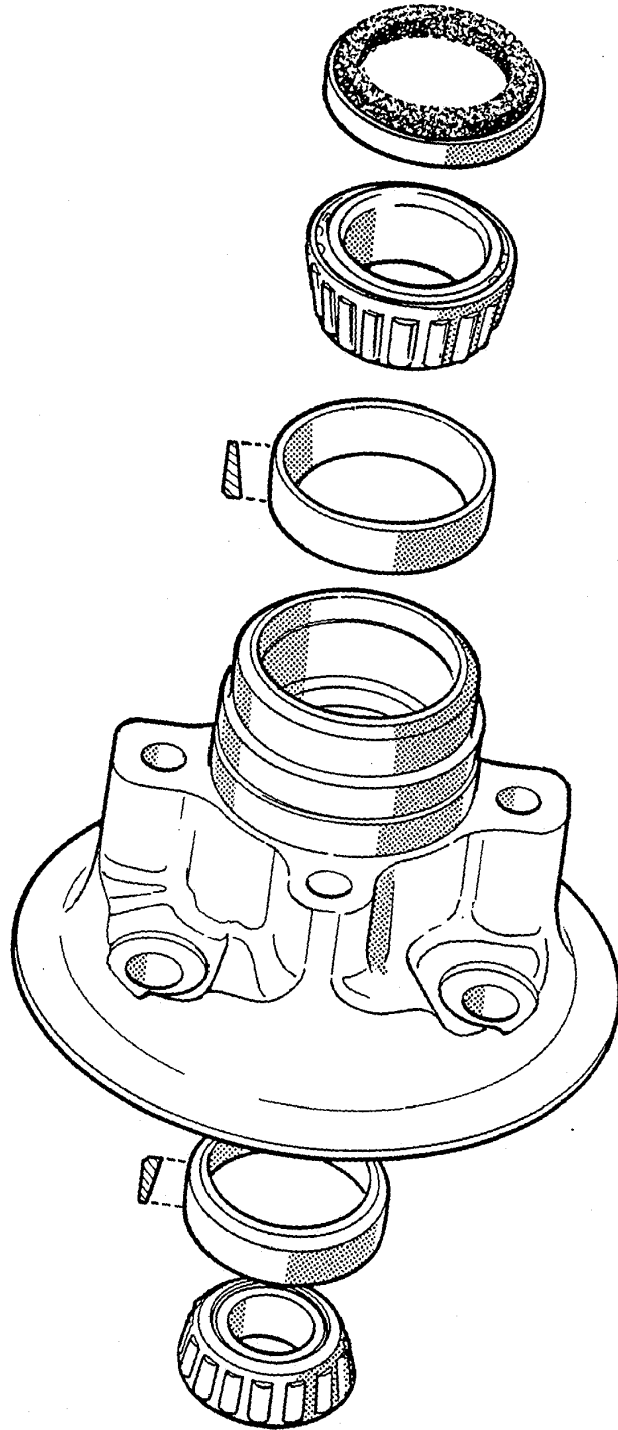


Fig. 4.5.2

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 2³/₄" 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 3¹/₂" 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 1¹/₄" 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 2¹/₂" 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 2³/₄"

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

When carrying out final tightening please refer to the table of torques in Section 3 page 4. However the 1/2" nyloc nuts securing the anti-roll bar to the top suspension links should be tightened to no more than 20 lb ft in order to obtain the correct preload in the bushes.

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 above

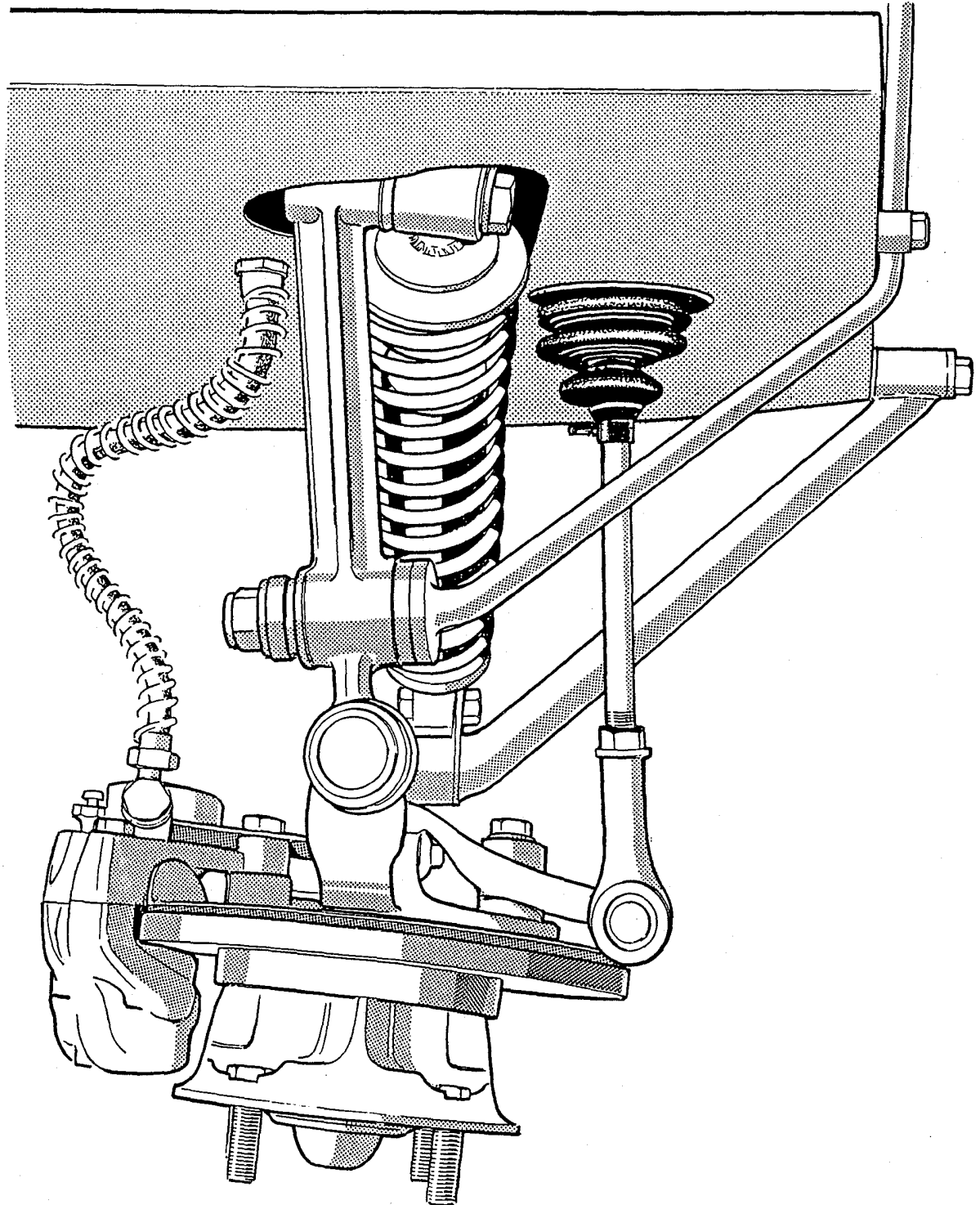


Fig. 5 B

FRONT SUSPENSION DE DION

5A.1. De Dion cars manufactured from July 1991 onwards are fitted with a revised front suspension incorporating double wishbones to provide better Castor angle control and thus improve the Seven's roadholding. Please refer to the diagram at the rear of this section which shows a general overview of this suspension layout. However before starting a small amount of preparation will be necessary.

1.1 We recommend that front clamshell wings are left unfitted until the front suspension is assembled since access is considerably easier. Indeed it is advisable to leave these off until after the engine has been installed.

1.2 The aluminium fan cover will need to be removed from the front of the chassis. It is secured by 3 7/16"AF nyloc nuts and washers.

1.3 When assembling the front suspension, there is a risk that the aluminium body skin can be damaged, especially when fitting the top mounting bolts and when the spring damper units are hanging down against the bodywork. It is therefore advisable, particularly with painted cars, to protect the bodywork with masking tape in key areas.

FRONT SUSPENSION DE DION

5A.2. Front Suspension Assembly - Upper

Using a 1/2" x 3¹/₂" caphead bolt, washer and half nyloc, assemble the Bilstein coil spring damper unit and the rear leg of the upper wishbone onto the upper mounting bracket on the chassis, the wishbone slotting into the mounting located behind the damper. Feed the bolt in from the front with the plain washer immediately behind its head, taking great care not to damage the body skin. At the same time, the forward end of the upper wishbone should be slotted into place into its mounting bracket on the chassis and attached using a 3/8" x 2" bolt and nyloc.

If racing specification Bilstein dampers have been chosen these should be fitted with their threaded ends downwards so that coil springs can be changed without removing the dampers from the chassis.

DO NOT TIGHTEN any fixings at this stage.

5A.3. Front Suspension Assembly - Lower

The front lower wishbones are handed, and are assembled with the longer arm forward and the circlip downward, as per the diagrams, Fig 5A.A and 5A.B. Each wishbone is fitted with a 1³/₁₆" OD, 5/8" ID spherical joint which is held in place with a circlip. take care to ensure that this circlip is correctly located.

Fit the rear leg of the wishbone in place through the slot in

FRONT SUSPENSION DE DION

the lower bodywork immediately behind the vertical chassis member and attach using a 1/2" x 4" bolt, plain 1¹/₈" washers and nyloc, the bolt facing forward with a washer under its head, and two 3mm thick washers between the wishbone and the chassis.

The front leg attaches similarly to the front of the chassis using a 1/2" x 4" bolt, plain 1¹/₈" washers and nyloc facing rearwards with both a washer under its head and two 3mm washers between the wishbone and the front of the chassis.

You will note that these washers take up any fore and aft play in the wishbone but enable subsequent adjustment of castor angles.

The spring damper unit is attached to the lower wishbone using a 5/16" x 2³/₄" caphead bolt which passes through the rear leg of the wishbone, through a 1/2" OD aluminium bush which fits into the lower damper eye, and into a captive thread in the front leg. This bolt requires no washer, but should be "Loctited" in place.

DO NOT TIGHTEN any fixings at this stage.

5A.4. Front Upright Attachment

The ends of the top wishbones are threaded and the adjustable ball joints will have been pre-fitted at the factory to the correct camber settings. Do not therefore slacken the M16 fine thread lock nuts which prevent the joints from screwing in and out of the wishbones or the factory settings will be lost

FRONT SUSPENSION DE DION

leading to possible unbalanced handling and excessive tyre wear. However, for competition purposes, it does facilitate the re-setting of camber angles to fine tune the car's handling.

The front upright/hub/disc assembly slots into the spherical joint in the lower wishbone, steering arm facing forward, and hangs from the ball joint secured with a M14 nyloc nut which must be tightened to 20-25 lb ft. Its bottom end is secured using a 1/2" nyloc nut which is tightened to 40 lb ft. Check that the upright swivels freely when tightened.

5A.5. Front Anti-roll Bar Attachment

The anti-roll bar is attached to the front of the chassis using special mounting brackets and cotton reel shaped rubber bushes. Fit the bushes into the brackets using plenty of rubber-lube and again using lube, slide both brackets over the ends of the anti-roll bar and round until they align with the holes drilled in the front face of the chassis tubes.

When these mountings have been fitted onto the bar the outer ball ends can be attached. Each end of the anti-roll bar is threaded to take a 10mm stud which should be screwed into place and "Loctited". Slide the rubber boot and securing bands over each end of the bar and screw onto each stud a plastic ball which should then be liberally coated with grease.

Assemble the anti-roll bar onto the chassis by pushing the plastic balls, one end at a time, into the mounting cups in the top wishbones and hold it in place using 5/16" x 1¹/₂" bolts

FRONT SUSPENSION DE DION

passed forward through the vertical chassis tubes and into the captive nuts on the mounting brackets, again using "Loctite". These bolts can be tightened immediately.

The rubber boots are slid over the plastic balls and secured to the top wishbone using the plastic bands which slip over the boot and hold it into the machined grooves provided. A smaller band is used to hold the boot onto the anti-roll bar itself.

5A.6. Final Tightening

The front suspension fixings should not be tightened until the engine is in place and the car's wheels are on the ground. This ensures that the rubber bushes are correctly preloaded and optimizes handling. All the 1/2" diameter bolts should be tightened to 40-45 lb ft, whereas the 3/8" bolts at the forward end of the top wishbone are tightened to 20-25 lb ft.

The fan cowling can now be replaced on the front of the chassis and secured using the 3 nyloc nuts and washers.

5A.7. Suspension Alignment

The front suspension is adjustable for both camber and castor angles and though the top wishbones normally come from the factory pre-adjusted you may wish to reset or change the basic settings. Factory recommended settings are therefore shown in the table overleaf.

For your information, increased negative camber will tend to improve the car's turn in characteristics in fast corners but at

FRONT SUSPENSION DE DION

the expense of possible tramlining on uneven surfaces and uneven tyre wear under normal conditions. The factory settings should therefore be adhered to except where the car is being prepared for motor sport.

The adjustment of castor is achieved by moving the lower front wishbone backwards or forwards in the chassis using spacing washers, therefore altering the effective kingpin angle. Increasing the angle away from vertical will produce more pronounced self centring of the steering and hence a greater feeling of stability, but at the expense of heavier steering.

Recommended Settings are as follows:

	Front	Rear
Tracking	0°20' +/- 0°10' Toe In	0°30' +/- 0°15" Toe In
Camber	1°00' +/- 0°15' Negative	1°00' +/- 0°15' Negative
Castor (Front only)	3°30' +/- 1°00'	(0°45' left to right)

Cyclewing connecting bolt 60/65

Front Suspension - View from front
Adjustable Top Wishbone Type

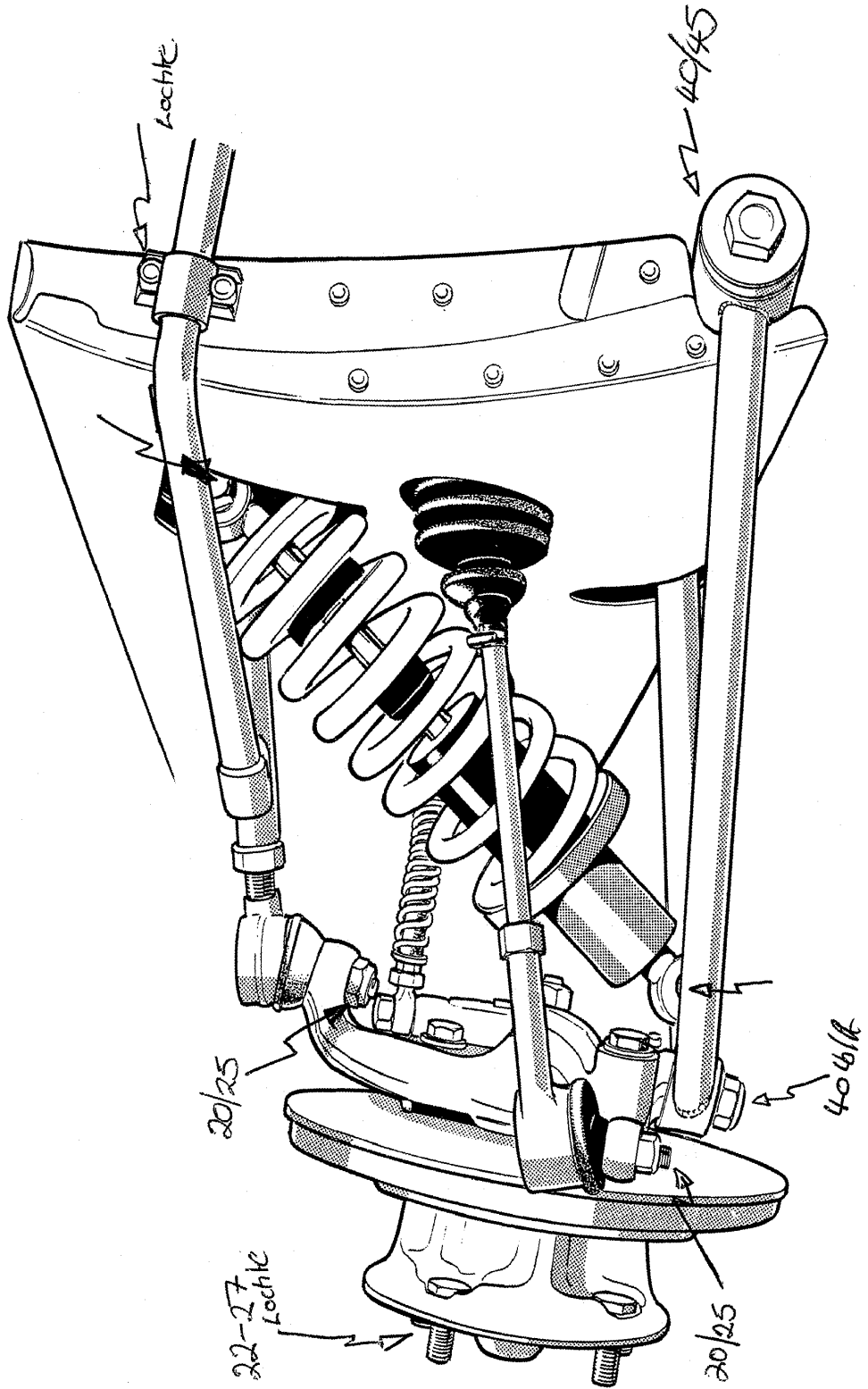


Fig. 5A. A

Front Suspension Layout - De Dion

View from above

Adjustable Top Wishbone Type

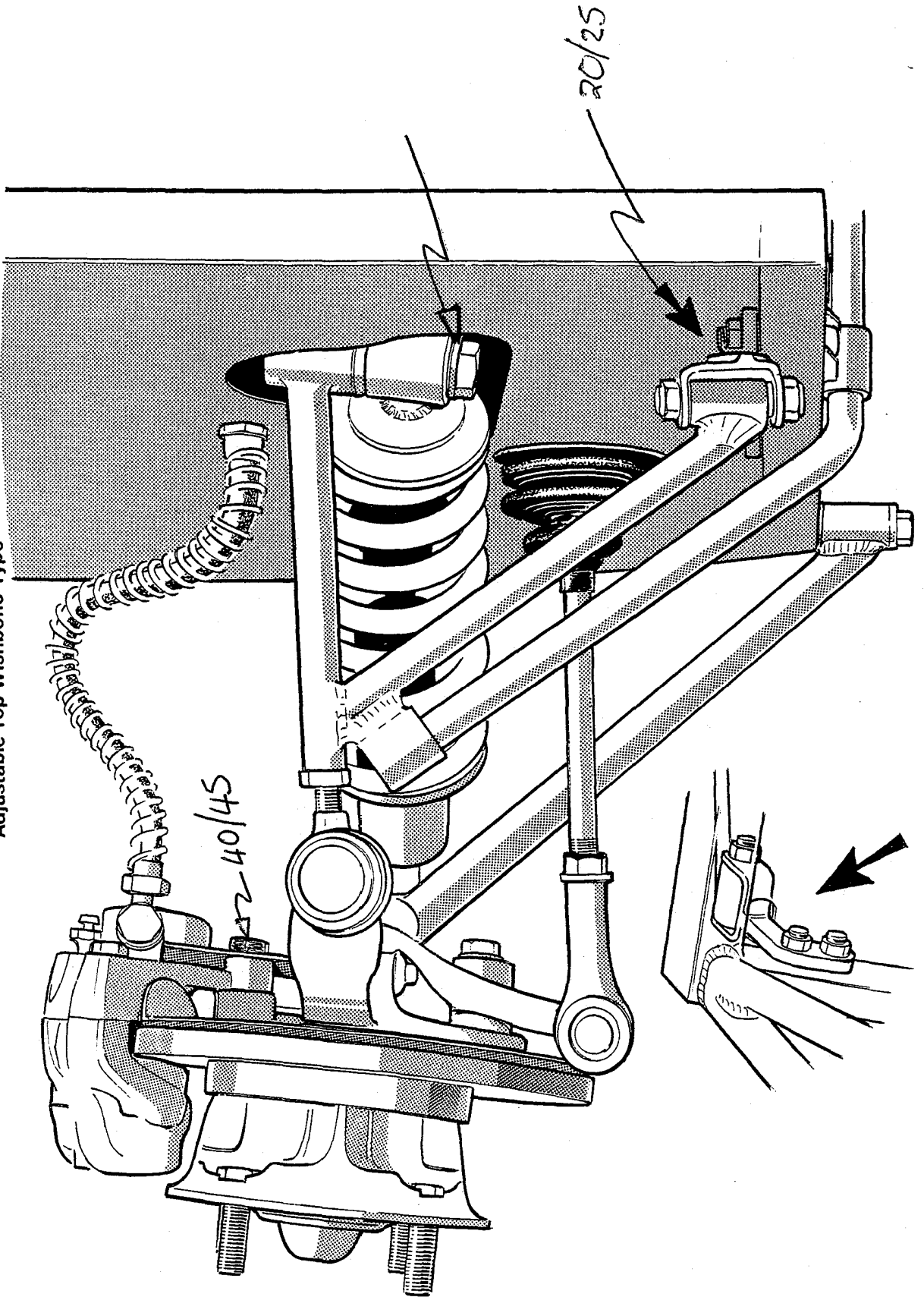


Fig. 5A. B

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 rack platform. Initially, therefore, clamp the rack into place loosely using the 1/4" x 2³/₄" bolts, nylocs and washers ensuring that a washer is placed between the steel bolt heads and the aluminium blocks and the aluminium spacers (provided with live axle cars only) are fitted between the blocks and the rack platform. 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 Live Axle Cars.

(For De Dion Cars read in conjunction with 6.5)

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 an accident.

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.

2.2 Attach the universal joint to the splined end of the column noting how the clamping 5/16" x 1³/₈" 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 1¹/₂" 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 exactly parallel.

6.4. Final Assembly

4.1 Before fitting the steering wheel, it will be necessary to fit the horn contact ring into the top of the steering column bush in the chassis. This is an interference fit and will need to be gently tapped into place. The black wire on this ring must be connected to the black/purple lead in the wiring loom adjacent to the steering column.

4.2 Attach the steering wheel to its boss using the small screws and nuts provided taking care not to damage the front faces of the screw heads or to scratch the black anodised finish on Motalita wheels. Slide the horn contact pencil into the hole in the boss.

4.3 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. Connect the wire from the horn contact pencil to the underside of the spring loaded steering wheel centre cap and finally clip the centre cap into position.

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

STEERING

6.5. De Dion Cars

5.1. These later vehicles are fitted with an enclosed pedal box assembly through which the steering column passes and since this box is sealed to prevent water ingress the steering column passes through two rubber grommets. It will be necessary to remove the lid covering this before the lower column can be fitted. (see Fig 6.5.)

5.2. Supplied with your basic kit is a flat aluminium plate with a large rubber grommet in the middle. This is used to seal the 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.

5.3 Similarly, a folded aluminium box fits over the steering column at the back of the pedal box containing a second identical grommet which should also be smeared with rubber lube. Again do not secure at this stage (see Fig 6.5).

5.4 Fit the column as normal (6.2.) and align the rack and column to clear the engine oil filter assembly before securing these plates in place.

Both plate and box are pre-drilled therefore the only drilling

STEERING

needed is into the front and top of the footbox/pedalbox. Use the rubber grommets to ensure the column passes through the plates centrally and mark and drill 5/32" holes in order to pop-rivet them into place, using silicone sealant to ensure waterproofing. In order to drill the holes for fixing the rear box a right angled drive drill will be necessary, although as a temporary measure the sealant on its own will hold the box in place.

Pedal Box Specification

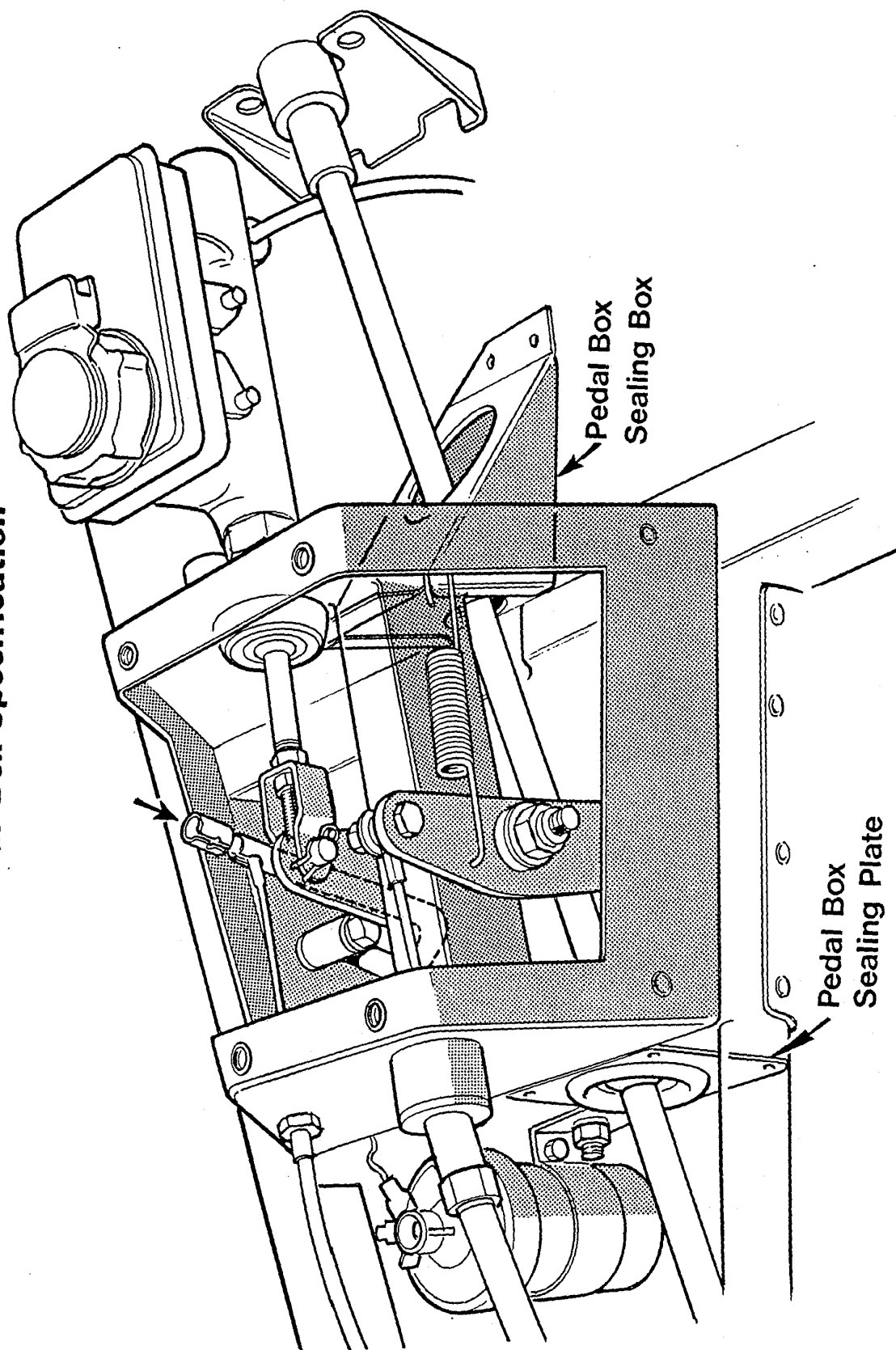


Fig. 6.5

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 disc brakes.

It is possible to source the differential second hand as it is a Ford Sierra item , and the kit is available without this item if a used item is preferred. The driveshafts and hub assemblies, 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. Exactly 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 come loose in service. Before fitting this however, check that you have been supplied with the correct item, the Vauxhall/Rover propshaft being identified by two white bands, and that the other end is a smooth sliding fit into the back of your gearbox.

REAR SUSPENSION - DE DION

If not call Caterham at once.

2.4 Insert the completed assembly into the transmission 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 through the metalastic bushes with plain 3/4" diameter washers either side of each bush. 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, between the thicker 3/4" washers and the differential itself. 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.

The 3/4" washers are important because they prevent either the bolt heads or the 7/8" washers from shorting out the sound and vibration absorbing qualities of the metalastic bushes.

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

REAR SUSPENSION - DE DION

with the differing sized washers in the same way. Tighten this to 40 lb ft.

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

The video shows the De Dion tube being partially assembled before installation in the chassis, although these instructions assume that the builder will fit the De Dion tube and driveshafts first, attaching both rear De Dion ears and hub assemblies with the tube in the chassis. Either way, the rear wings should not have been fitted or access becomes difficult.

3.1 Place the De Dion tube into the chassis noting that the outer 'ears' face forward and the diagonal link 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

REAR SUSPENSION - DE DION

suitable drift taking care not to damage the bearing face. If possible this job is better done using a press at your local garage. Note that each bearing outer housing should be fitted with its smaller inner diameter innermost into the hub carrier.

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 but the flange to which the brake calipers fit must be at the top) over one of the driveshafts and attach to the De Dion tube, noting that thin aluminium plates are fitted over the hollow ends of the tube. These holes in these plates are not symmetrical so ensure they align correctly. Bolt the ear 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. (see Fig. 7.3.4.)

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

3.5 Position the rear hub carrier the correct way up and slide this over the end of the driveshaft taking care not to damage

REAR SUSPENSION - DE DION

the bearing seals. Bolt the hub 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.

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, are tightened to 35 lb ft.

3.6 The rear hubs are specially manufactured items with their drive flanges machined to fit brake discs identical to those fitted at the front. The discs are bolted to the flanges using 4 3/8" x 5/8" UNF crown head bolts each side using Loctite and torqued to 30 lb ft. Ensure that mating surfaces are thoroughly cleaned as any dirt present can cause disc run-out.

3.7 Slide each of the rear hubs complete with brake discs 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 41mm 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.

It is important at this stage to check that the outboard driveshaft universal joints do not foul the inner edges of the De Dion ears. If they do, slacken the bolts holding the hub

REAR SUSPENSION - DE DION

carrier to the ear and adjust until there is sufficient clearance. Retighten to the correct torque settings.

3.8 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, plain and locking washers with the spacers fitted between the ear and the caliper. Loctite should be used and the bolts tightened to 35 lb ft. (see Fig. 7.3.8.)

7.4. Assembly of Rear Suspension

4.1 Fit the radius or "Z" arms to the chassis with the offset inwards to provide maximum clearance to the brake calipers when fitted, noting that they are not exactly parallel to the chassis tubes. These are secured using 3/8" x 3¹/₂" plated bolts passing outward from the cockpit and secure with plain washers on the outside of the radius arm bushes and nyloc nuts. There are two alternative positions for these arms, a higher location which will provide a slightly better ride and a lower location biased in favour of handling. In the lower position it may be necessary to trim the wing flange to gain adequate clearance around the radius arm front mounting.

4.2 Attach the rear end of the radius arms to the brackets on top of the De Dion tube using 1/2" x 2¹/₂" bolts and nylocs passed inward to the centre of the car, do not fully tighten yet. It is imperative to check the clearance between the De

REAR SUSPENSION - DE DION

Dion tube and the rear of the differential casing throughout its full arc of travel, particularly if the rear radius arms are fitted in the upper position. Relieve with a course file if necessary.

4.3 If it is intended that Inertia Reel seat belts or an FIA approved competition roll-over bar, are to be fitted considerable time will be saved if they are installed now since once the spring/damper units are fitted it will not be possible to reach their fixings. Please refer to Miscellaneous Section 9.5.4 for Seat Belt installation.

Before fitting the seat belt inertia reels however the "U" bolts to which the rear anti-roll bar will be suspended must be put into place with their threaded ends pointing downwards through the holes provided in the bottom of the inertia reel mounting boxes. Once the reels have been fitted these "U" bolts cannot slip out of position.

The rear spring/damper units are suspended from their mountings under the top of the spaceframe using 1/2" x 2¹/₂" bolts and lockwashers inserted from the rear through the access holes provided inside the boot compartment. Do not fully tighten yet.

4.4 Slide a greased 1/2" x 5¹/₂" 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, checking that there is clearance between the protruding thread on the bolt and the rubber boot on the driveshaft.

REAR SUSPENSION - DE DION

4.5 The De Dion tube is located laterally using an "A" frame, which has bushes fitted to its forward ends and must be fitted the correct way up which is with the frame itself below the centreline of the outer bushes. Insert the two rubber/metal Y16 half bushes into either side of the central mounting hanging down from the De Dion tube and position two thin 7/8" diameter washers (differential spacing washers) between the two bushes where they meet, this sets the correct preload on the joint. Attach the "A" frame using a 1/2"x 2¹/₂" bolt plain washers and a nyloc nut, positioning a washer under both the bolt head and nut.

Secure the forward outer ends of the "A" frame to the mountings provided on the chassis using 1/2" x 4¹/₂" bolts plain washers and nylocs passing the bolts inward with the washers under the nylocs. Do not fully tighten any of these mountings yet.

4.6 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. If not insert spacing washers between the chassis and forward ends of the "A" frame until an acceptable tolerance is achieved.

7.5 Rear Anti-roll Bar Attachment

5.1 The rear anti-roll bar is suspended above the differential from "U" bolt mountings immediately below the inertia reel seatbelt boxes with its blades facing rearward to pick up onto

REAR SUSPENSION - DE DION

the De Dion tube through a vertical link.

The anti-roll bar is attached to the 5/16" "U" bolts pointing downwards under the inertia reel housings using split aluminium blocks similar to those holding the steering rack, though smaller, with the thicker half of the block above the anti-roll bar. The bar is mounted using rubber cotton reel bushes sandwiched by these blocks and secured using plain washers and nyloc nuts. The Cotton reel bushes can be slid over the anti-roll bar with the help of a little rubberlube.

5.2 The anti-roll bar is positioned horizontally in the car and its blades are connected to the radius arm brackets on the De Dion tube using two drop links. Attach a drop link to the outer edge of each blade using an 8mm nyloc and screw the lower ends of the links into the threaded bosses on the outer radius arm brackets, using plain 8mm nuts on the protruding threads to lock them in place.

The handling characteristics of the car can be altered by re-positioning the drop links into alternative holes in the anti-roll bar blades. The rearmost hole is recommended for road use maximizing safe understeer, while the foremost hole increases the effect of the bar to bring in more oversteer.

7.6. Final Assembly

6.1 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

6.2 Bend the steel brake pipes to fit as tightly as possible to the De Dion tube and attach to both the union and respective 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 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. The use of flexible brake hoses here is not considered necessary.

6.3 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.**

6.4 The handbrake cable can now be fitted. This is double ended and is designed to be attached to both rear calipers 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 nylon adjusters on the cable to ensure plenty of slack. Fit each end of the cable into the respective brake caliper, noting that the cables are above both 'A' frame and the lower chassis rail. The inner ends of the cable are fed

REAR SUSPENSION - DE DION

through the abutments in the caliper and hooked over the brake levers. The cable outer is secured by the caliper body.

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.

6.5 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.

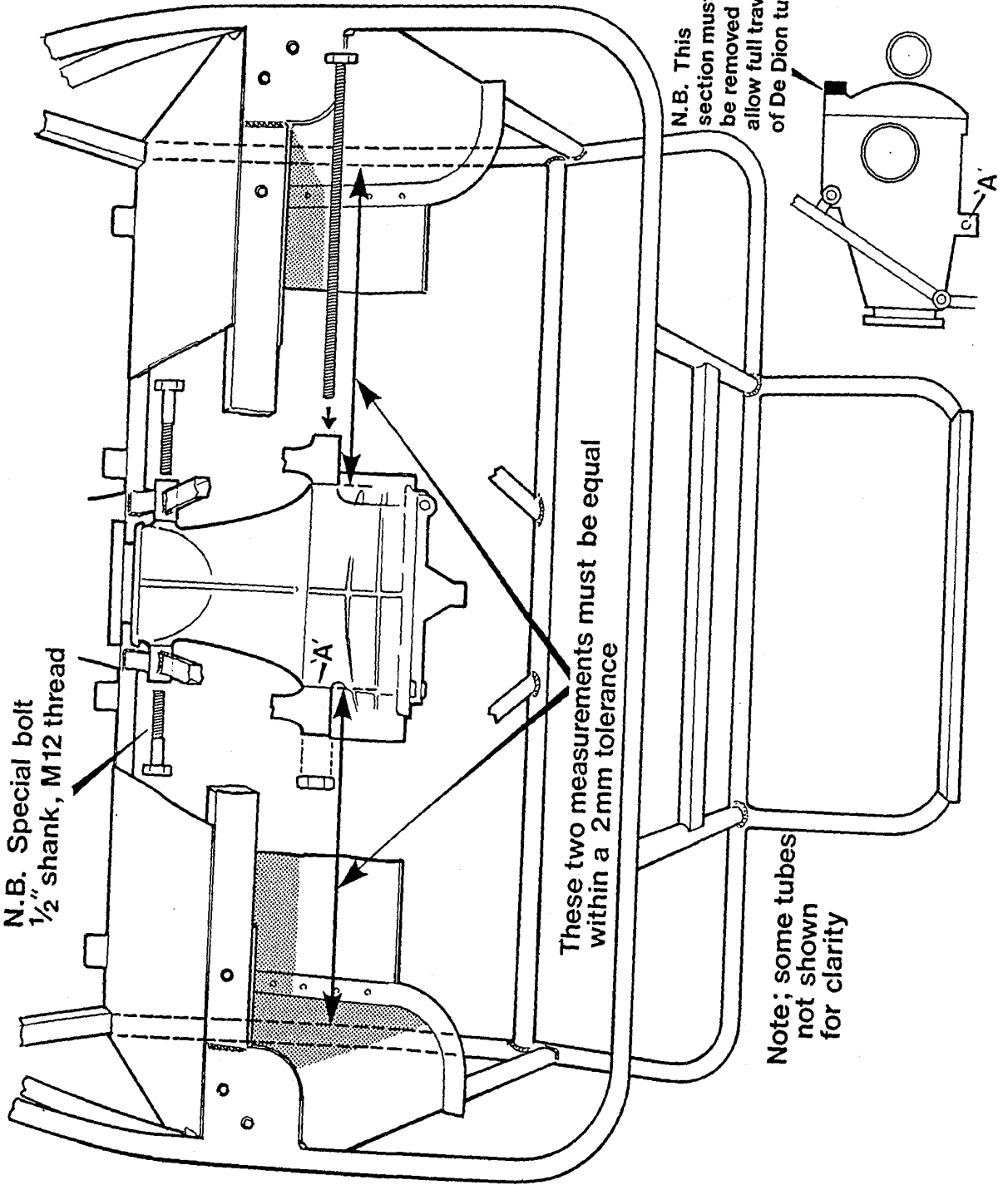
6.6 Tighten all the bolts through rubber bushes securing the rear suspension as follows. The 1/2" bolts should be tightened to 40-45 lb ft and the 3/8" bolts to 35 lb ft. When the top spring/damper mounting bolts have been tightened, the access holes are filled using the rubber grommets supplied.

6.7 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. Alternatively these nuts can be attended to at Caterham Cars if your car is brought in to us for its post build check. On no account must the car be driven until these nuts are correctly tightened.

41mm sockets are available from Caterham under Part No. 79067 and since this is a 3/4" drive socket, appropriate adaptors to 1/2" are also available.

Position of Differential Unit

N.B. Special bolt
1/2" shank, M12 thread

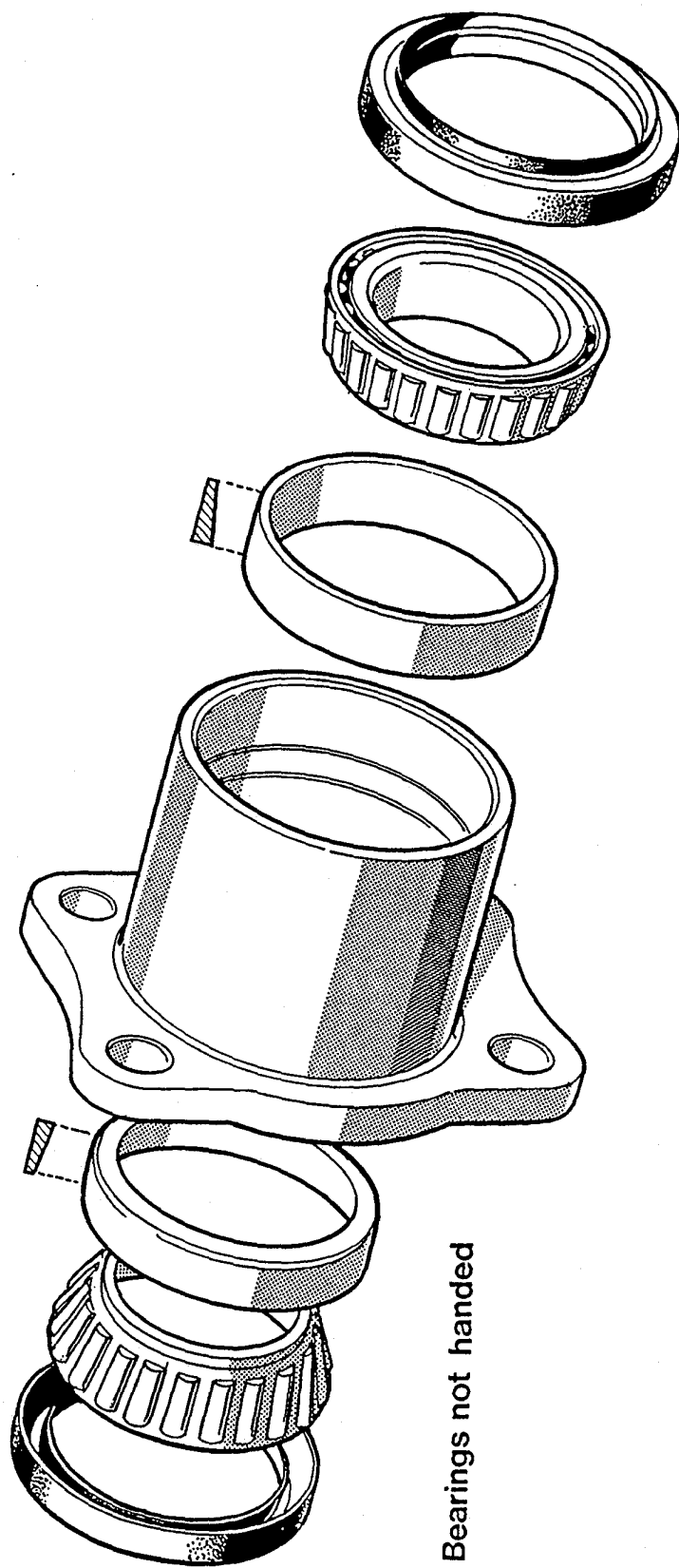


These two measurements must be equal
within a 2mm tolerance

N.B. This
section must
be removed to
allow full travel
of De Dion tube

Note; some tubes
not shown
for clarity

Rear Hub - Bearing Arrangement (De Dion cars)



Bearings not handed

Fig. 7.3.3

De Dion Rear Hub Assembly - Disc Brakes
(viewed from above)

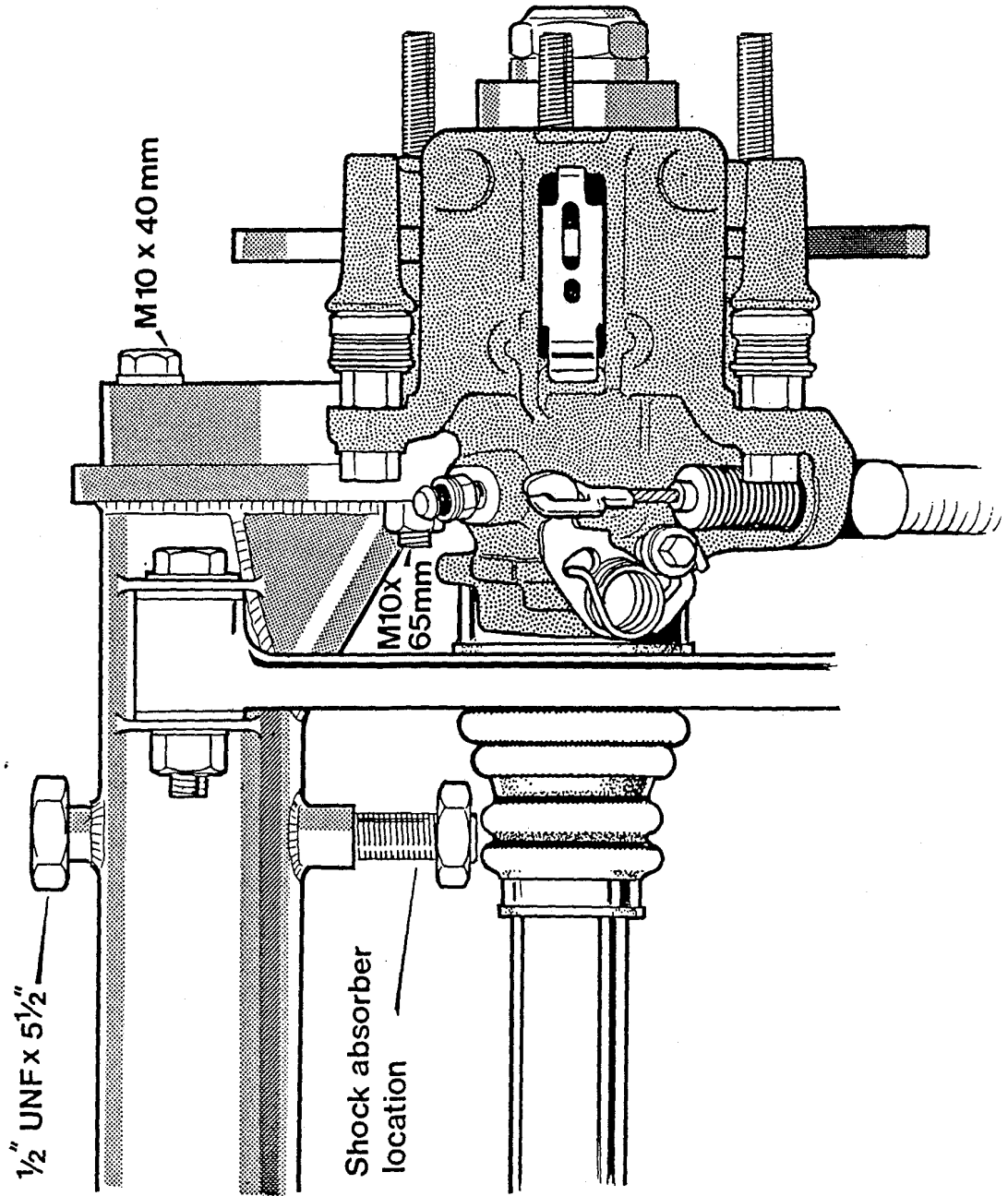


Fig. 7.3.4

General View Rear Disc Brake Assembly

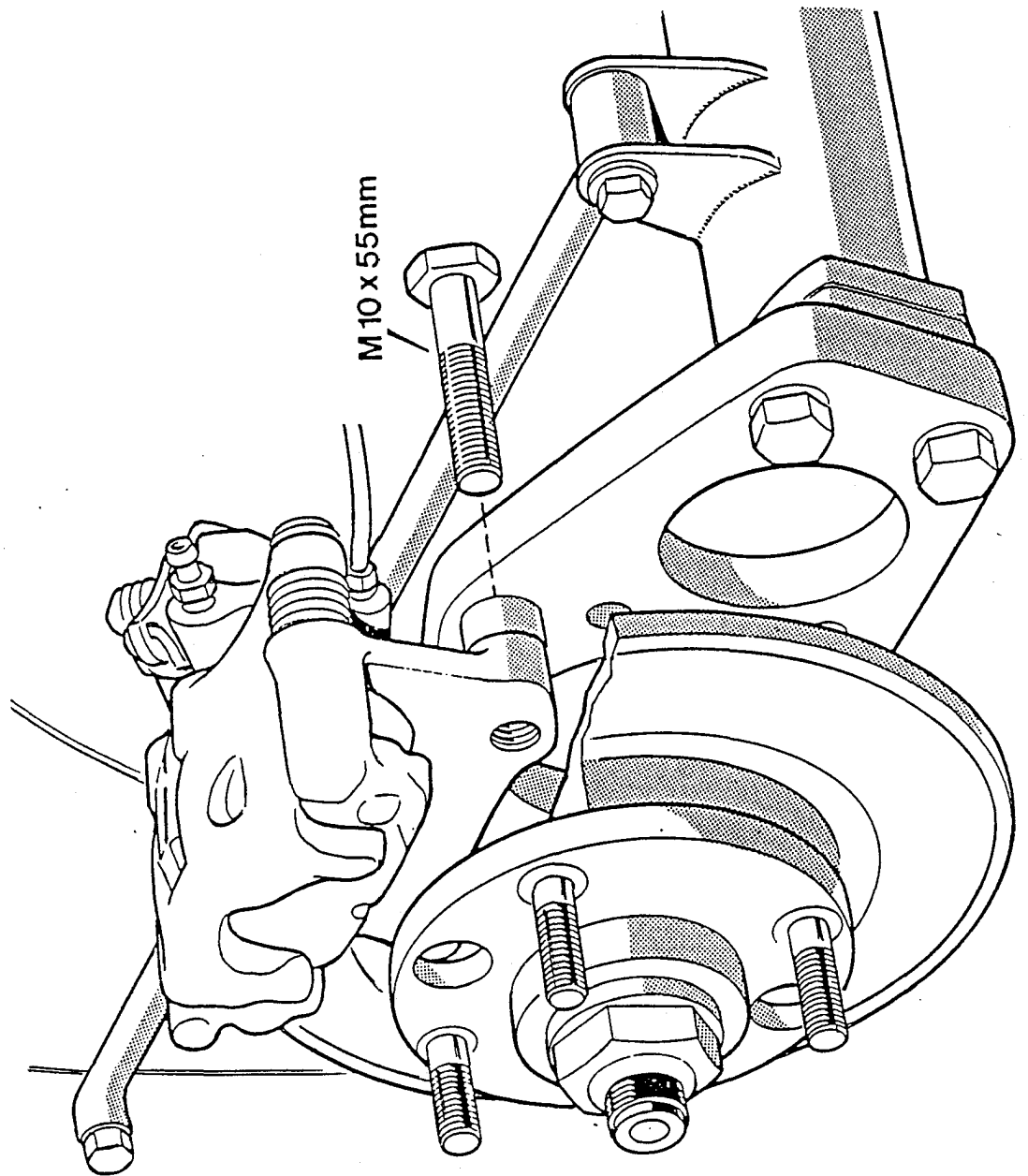


Fig. 7.3.8

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 supercession 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 lower 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 4¹/₂" 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 3¹/₄" plated hex 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 2¹/₂" 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

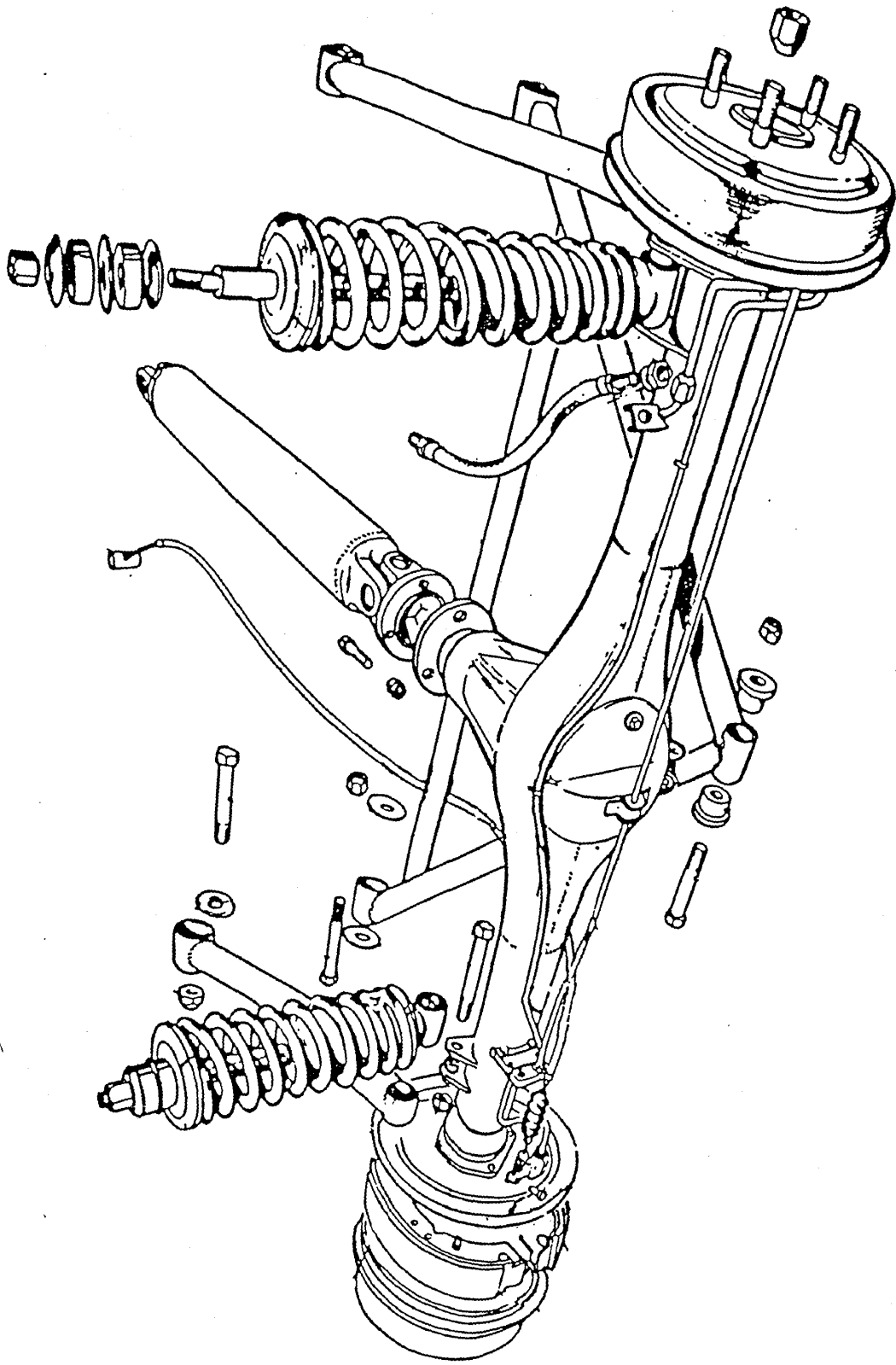
unwanted preloadings are present in the bushes. Axle stands are ideal for this purpose.

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 between 25 and 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.

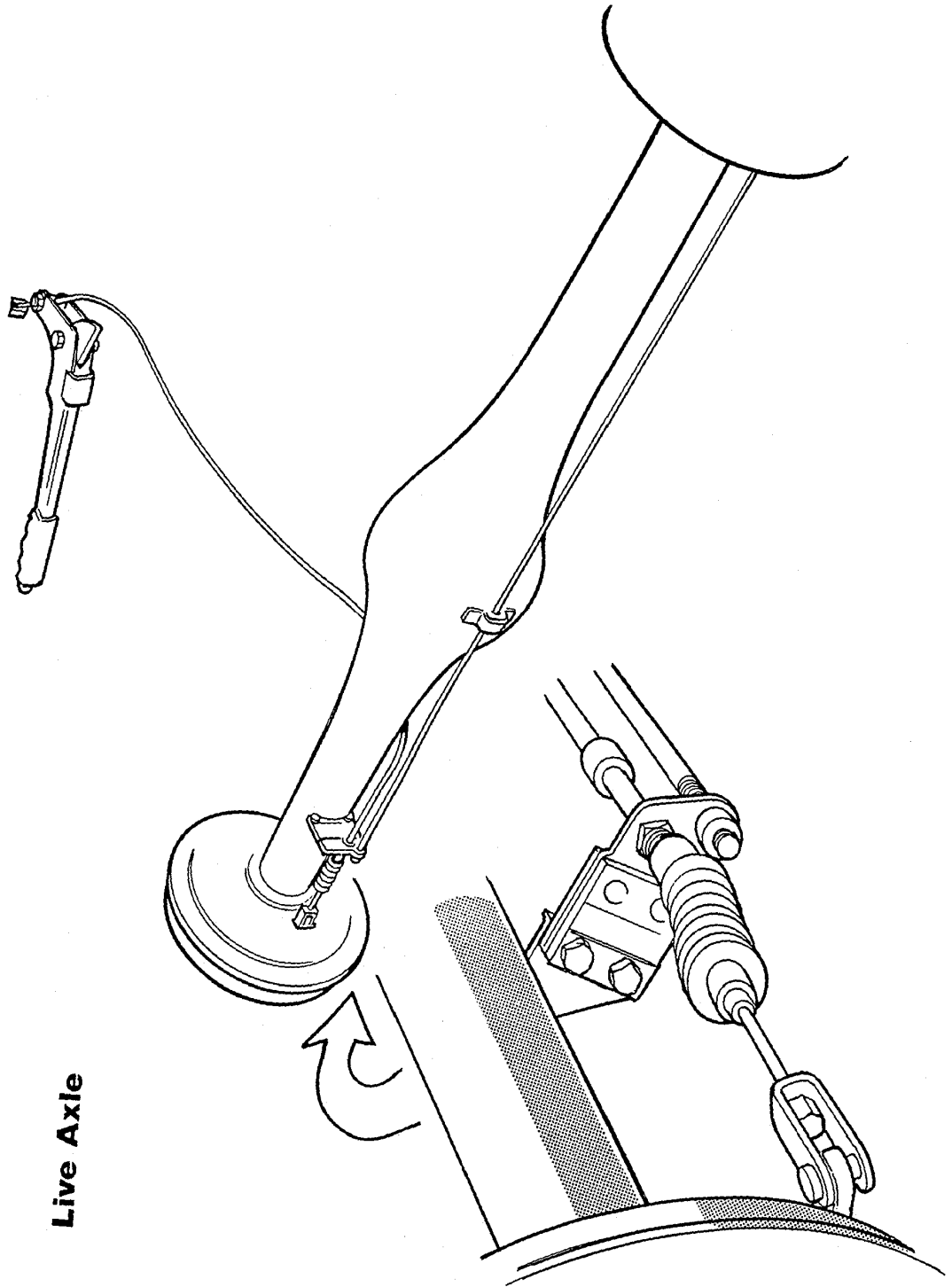
If they are not, and your back plates are not distorted, the 'A' frame centering can be adjusted by moving spacing washers from one side to the other.



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.

Immediately inside the body are located the steel brake pipes from the Master Cylinder and these are fitted with appropriate female unions. Tighten these connections 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.

1.5 Please note that although the optional Stainless Steel braided "Aeroquip" hoses are fitted in exactly the same way the

INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

likelihood of fouling the suspension on lock is more likely to occur and it may help to undo the connection into the caliper and twist the hose through 180°.

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.

It should be noted that this hose may be in contact with the turned down aluminium edge of the front part of the boot floor. To avoid chaffing a piece of plastic edging is provided with the chassis and this should be slid along to protect the flexible hose.

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 1703f DOT 4 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.

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. we recommend that the area around the master cylinder is protected during the bleeding process.

The rear calipers can be difficult to bleed therefore it can help if you tap the caliper body during bleeding to release air pockets. It may also help to tip the car downwards on the side

INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

being bled to enable air to escape from inside the caliper piston.

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 still 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° and 30° 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 2³/₄" bolt and nyloc as the handbrake pivot and the 1/4" x 2³/₄" 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.

Please note that when assembling the handbrake barrel, the longer end with a groove in it must face downwards. This is to enable the Handbrake Cover to be fitted. The cover is slid over the handbrake lever, after it has been fitted but before tightening the cable, and locates so that the handbrake barrel protrudes through the hole in the cover fitted with a protective sail eyelet. Secure in place using the circlip provided.

2.3 The longer handbrake cable will have been installed into the rear brake calipers 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 pads are not binding. Ideally set the handbrake

INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

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.

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 of horizontal part of the front bulkhead in the centre above the gearbox. Offer up the washer bottle clipped into its mounting bracket and mark a suitable location for the bracket ensuring that the bottle is well clear of the gearbox, which means that the bracket will be protruding above the top of the chassis cross tube. This mounting bracket is riveted or screwed in place with self-tapping screws.

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. These wires emerge from the loom adjacent to the brake light warning switch on the right hand chassis tube away from the foot box.

INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

4.2 Horns

The twin electric horns are located under the steering rack platform and secured to the bolt holding the lower cooling fan mounting bracket. Use two aluminium spacers to hold them clear of the platform flange and to prevent contact with the underside of the platform. Noting that they are handed the horns are positioned to face outwards and backwards with their wiring connections facing each other. (For air horns see options section)

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 onto the separate bracket (provided in the basic kit) which is specially shaped to hook onto the top of the battery (see parts identification sheet)

The battery should be positioned with its live (+) connection forward and to this is bolted the red lead which runs forwards along the upper face of the lower chassis diagonal tubes, between the vertical tubes adjacent to the engine mountings and the body skin and round to the starter solenoid connection.

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

The two brown wires emerging from the loom above the battery are

INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

also connected to this live (+) terminal using the clamping bolt and it will be necessary to cut the red cover slightly to clear them.

The earth (-) lead is routed over the battery, around the fixing clamp and connects to the nearest bolt holding the engine block onto the bellhousing.

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.

Please note that on De Dion cars it is important that the battery is fitted before the engine is installed or the carburettors and steering column will need to be removed in order to get it into place. On Live axle cars it is possible to fit the battery from underneath.

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.

INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

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.

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 Nose Badge

The circular nose badge is fitted by drilling the nose cone at the point marked and securing from underneath with an appropriate plain washer and nyloc nut.

5.3 Mirror

This is stuck by its self adhesive pad to the windscreen as high up as possible on the centreline of the car, noting that the mirror can be inverted on its stalk to minimise the windscreen area obstructed or to provide a better rearview for shorter drivers.

5.4 Seat Belts

Mountings are fitted which comply with all EEC regulations (including German TUV) and specially made Static lap and

INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

diagonal belts for live axled cars or Inertia Reel belts suitable for 1990 specification De Dion cars 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.

Inertia Reel belts can only be fitted to De Dion cars with special mountings which locate the Inertia Reel unit under the rear bulkhead immediately in front of the rear spring/damper units. The spring/dampers must be removed before the belts can be fitted.

These mountings are accessible from inside the rear wheel arches where the reels are bolted vertically using 7/16" bolts, nuts and lockwashers, the bolt passing forwards. It will be necessary to unwind the webbing from the reel to get a socket spanner onto this nut. Access holes are provided in the rear bulkhead to enable them to be tightened and these are sealed with rubber grommets.

The seat belt buckle and webbing is passed up through the slots and the pillar loops are attached to the top outer corners of the bulkhead using 7/16" bolts into the captive threads in the

INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

mushroom shaped mountings. These are then finished off with the small plastic covers clipped over the bolt heads. The belts are protected from chaffing in these slots by plastic protectors which will require trimming before clipping into place.

The lower loop is bolted to the chassis side ensuring that the webbing is not twisted and the stalks are bolted to the mountings on the transmission tunnel. Trim escutcheons are supplied to finish the slot in the back panel and these will need to be trimmed to clear a diagonal chassis tube before being clipped into place.

Finally the compartments containing the reels are sealed from the wheel arches by rivetting the pre drilled aluminium plates in place using 5/32" rivets and some silicone sealant to prevent water ingress.

5.5 Front and Rear Wings

Front: Attach to the chassis the front wing stays, which also incorporate the headlamp mountings, not tightening at this stage. Please note that these are handed and once in place the headlamp brackets face forward. Cut an approximately six inch length of self adhesive foam strip and attach it to the outer top edge of each wingstay to act as a vibration damper.

The wings are pre-drilled to line up with the riv-nuts fitted to the side panels and each is attached with a combination of 2 5/16" bolts one being at the rear and a number of 5mm x 20mm bolts, all with 3/4" plain washers, and at the same time rubber

INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

piping is fitted between the wing and the body. The rubber piping will need to be cut to length and cut in a series of "V"s in order to allow for the wing bolts, and should end up with the flat strip clamped between wing and body while the beading itself should be positioned on top of the joint to provide a neat finish.

Do not overtighten the wing fixings since this can cause the riv nuts to rotate in the side panels.

With the wings in place adjust the front stays so that the centre of the stay matches that of the inside of the wing and ensuring they are vertical tighten the pinch bolts holding the stays to the chassis.

The wing should be attached to the wingstay with a single traditional galvanised gutter type bolt. The $\frac{1}{4}$ " hole for this bolt should be drilled through the wing approximately $1\frac{1}{2}$ " forward of dimples where the repeater light will be fitted and 2" from the outside edge of the wing. After drilling the wing, position the wing stay centrally underneath the hole and drill down through the wing into the stay.

Lastly insert the gutter bolt and nip up the nut. NB. DO NOT OVERTIGHTEN as this will indent the bolt head into the wing.

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 $\frac{3}{4}$ " plain washers and are pre-drilled accordingly.

INSTALLATION OF ITEMS COMPRISED IN THE MISCELLANEOUS KIT

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 $3\frac{1}{2}$ " apart and $2\frac{1}{2}$ " back from the front of the wing. With the wing correctly located drill down through the bracket and secure with 5mm x 35mm pozidrive screws and nylocs. The rear holes should also be drilled $3\frac{1}{2}$ " apart and positioned to line up with the rear bracket.

Hand Brake Cable Installation - De Dion

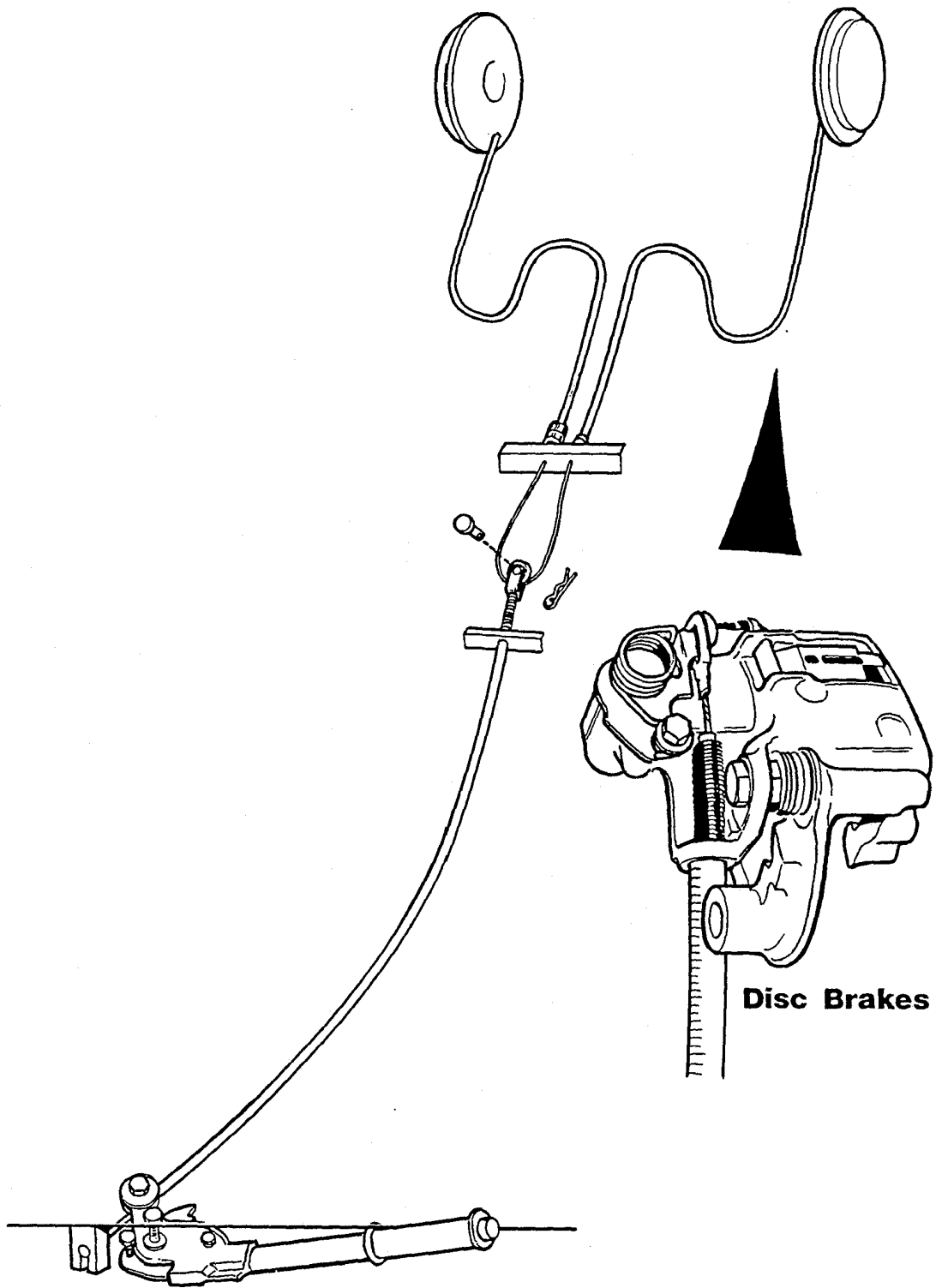


Fig 9.2.1

Inertia Reel Seat Belt Installation

Note: Cut away back of escutcheon to clear chassis diagonal 'A'

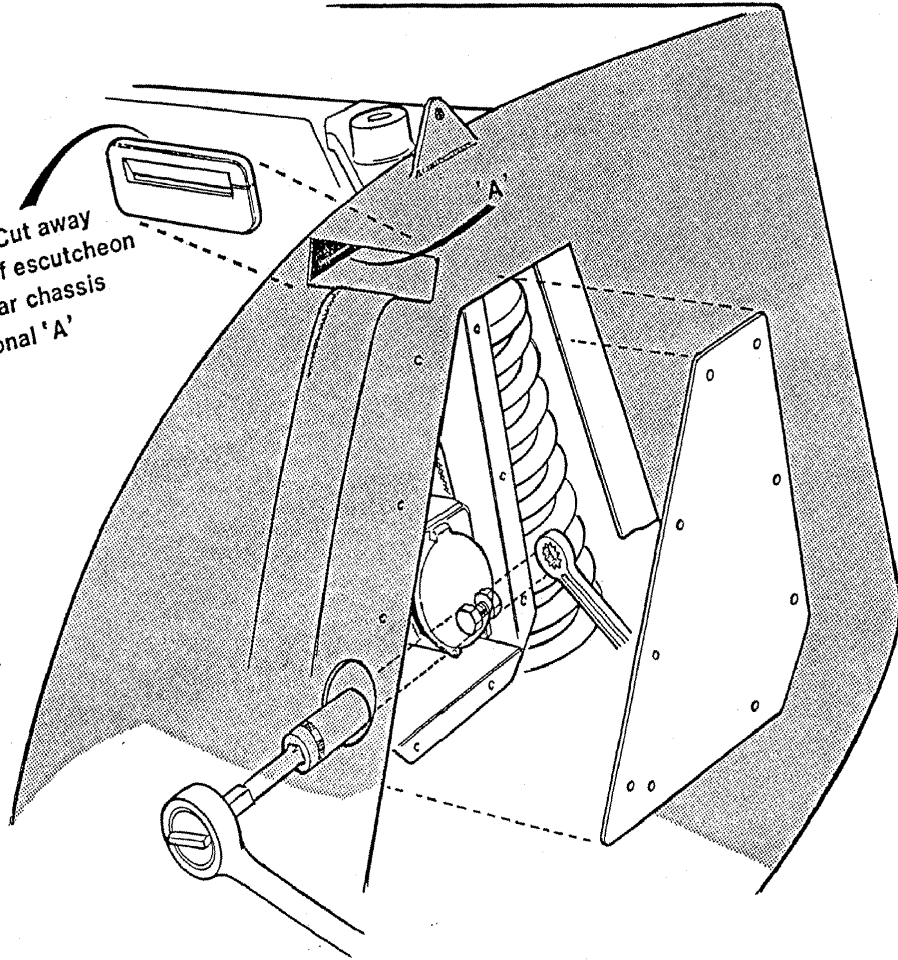


Fig. 9.5.5

CROSS - SECTION THROUGH TWO MODIFIED GEAR LEVERS

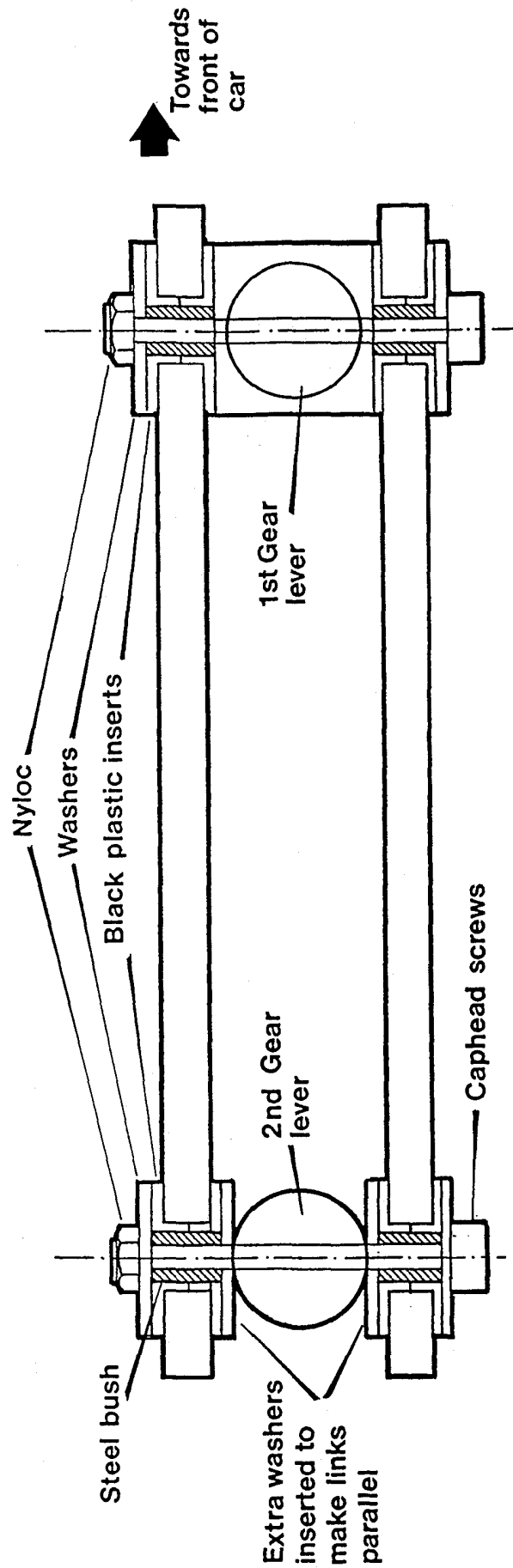


Fig. 10.2.6

Left hand drive hydraulic clutch

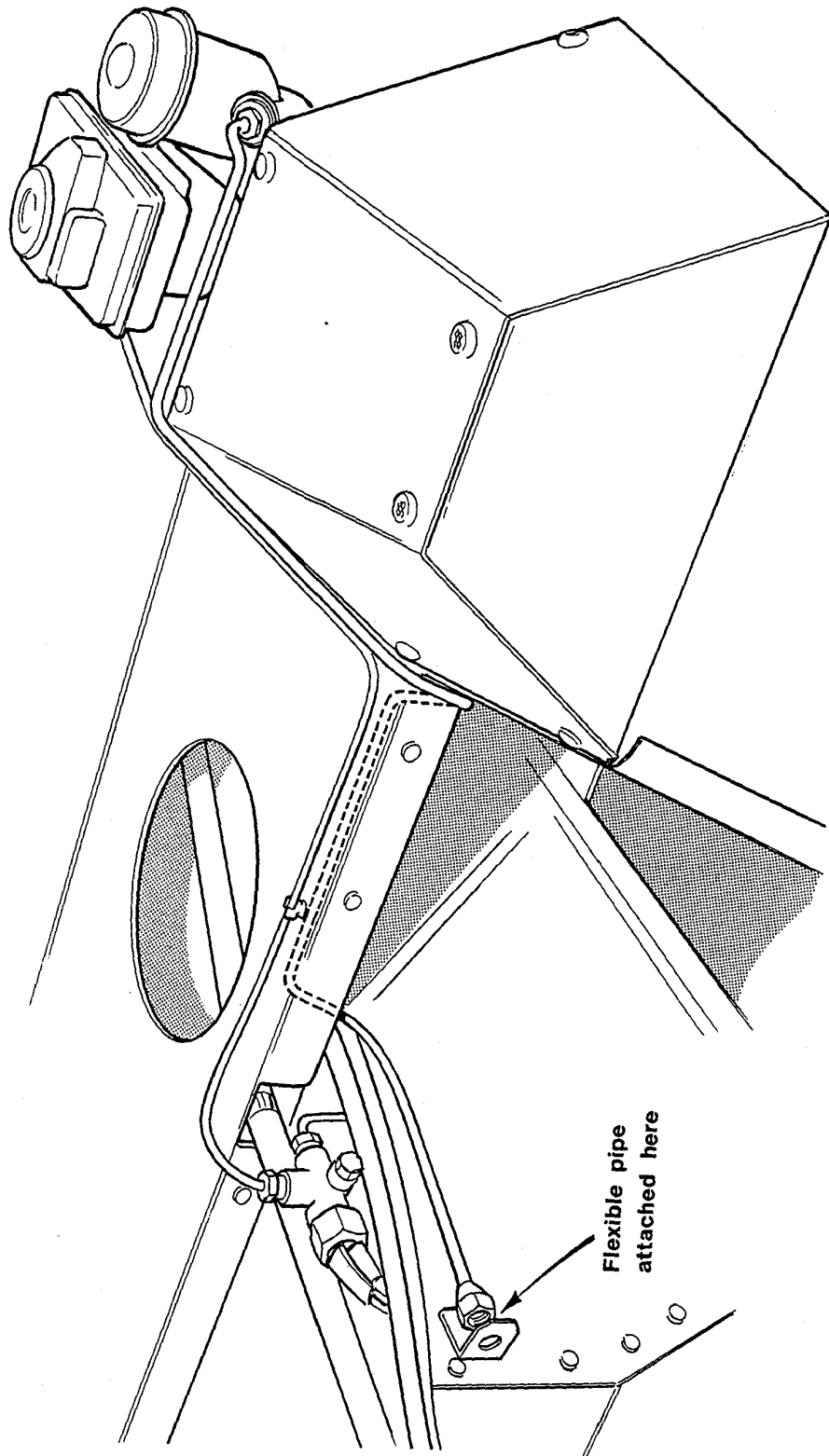
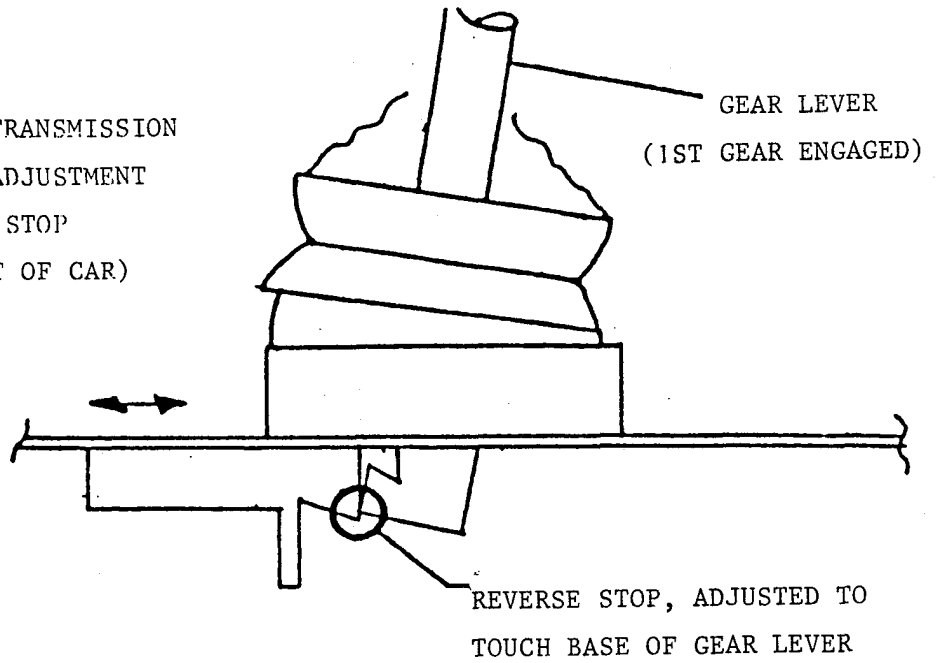
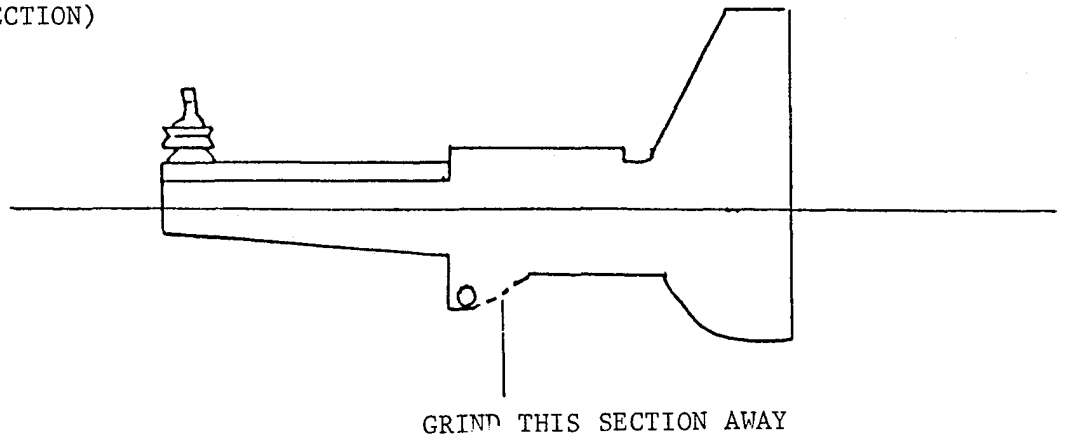


Fig 10.3.9

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

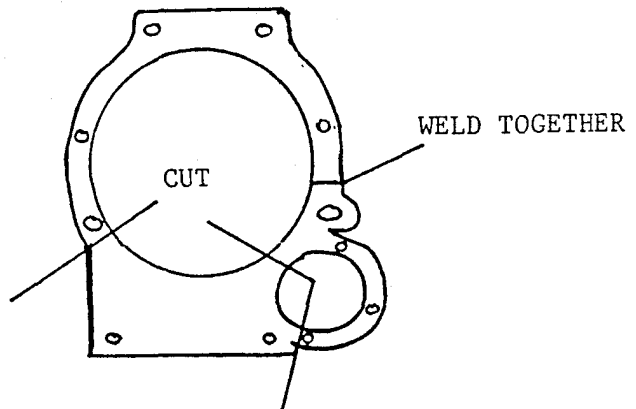


Fig. 10.4.4

Wiring Connections Under Bonnet

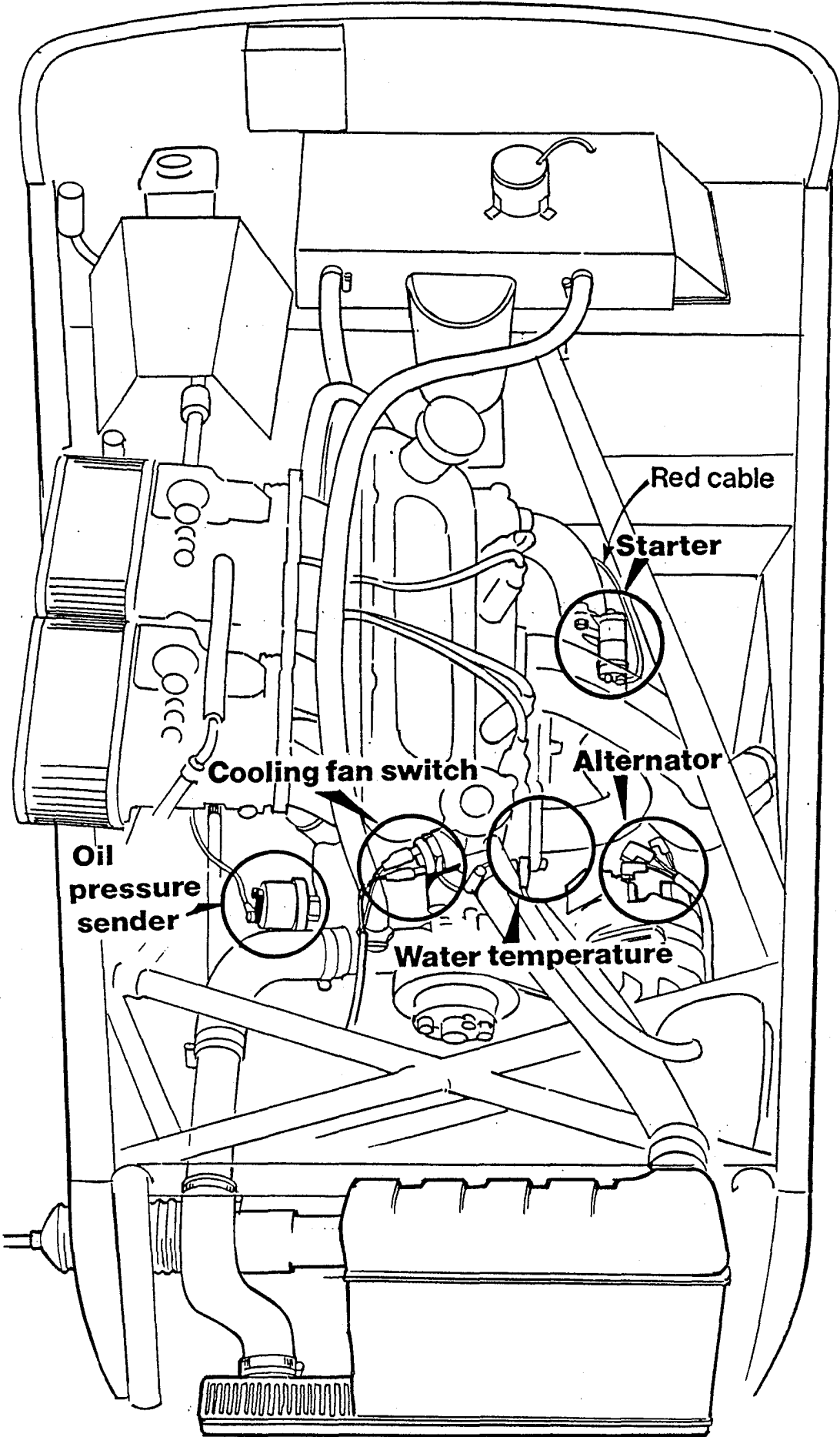


Fig. 10.7

INSTALLATION OF VAUXHALL ENGINE

Although this section is broadly similar to Section 10 of the Assembly Guide, there are some key differences between the Vauxhall DOHC 16 Valve engine installation and the Ford derived engines covered in Section 10. In order to avoid duplication, please refer to section 10 in conjunction with this section.

10A.1. Assembly of Gearbox Kit - Five-Speed XR4i

The Vauxhall powered car uses the same Ford gearbox though with different bellhousings which eliminate the need for an adaptor between the bellhousing and gearbox. The optional dry sump system uses an integral bellhousing/oil tank and employs a hydraulic clutch mechanism so after assembling the gearbox itself please refer to 10A.2.

Follow the gearbox build up instructions in 10.1. with the exception therefore of 10.1.2. where the bellhousing bolts directly to the front of the gearbox, noting that the gasket still needs to be used. Tighten the M12 x 40mm fine thread bolts to 60 lb ft and use loctite to ensure they do not work loose.

Note also that though the clutch mechanism uses the same components as the Ford installation, the rubber gaiter which prevents dirt from entering the bellhousing is not provided with a metal clip to hold it in place. This is not considered necessary in view of the dimensions of the bellhousing.

INSTALLATION OF VAUXHALL ENGINE

10A.2 Bellhousing/Dry Sump Tank Assembly

2.1 This is a complicated aluminium casting, and although it has been pressure washed both by the manufacturers and Caterham Cars there is a possibility that some sand may remain in the oil tank. It is important therefore to check inside very carefully and to scrub out any remaining sand residues.

2.2 fit the clutch bleed screw to the left-hand upper face of the casting.

2.3 to the lower left-hand side of the casting, fit a 1/2" by 5/8" male/male pipe adaptor, screwing the 1/2" end into the casting using a crush washer (dowty seal) to prevent leakage. To the right-hand side of the casting, fit the small blanking screw.

2.4 Apply a smear of silicon sealant and attach the square cast cover plate to the underside of the casting using M6 x 16mm caphead screws. We recommend the use of loctite on these screws.

2.5 Attach the rectangular plate with the oil filler neck to the top of the casting again using M6 x 16mm caphead screws and silicon sealant with loctite.

2.6 this top contains two horizontal and two vertical holes. The right-hand horizontal hole is blanked off with the plug provided and the left-hand hole is fitted with an aluminium elbow which will ultimately be connected to the engine oil catch tank.

INSTALLATION OF VAUXHALL ENGINE

2.7 The right-hand vertical hole is fitted with a 1/2" by 5/8" male/male adaptor, the 1/2" end with a dowty seal being screwed into the casting. The left-hand hole is fitted with a 1/2" by 1/2" male/male adaptor again screwed in with a dowty seal.

2.8 The bellhousing assembly is secured to the front of the gearbox with 4, M12 x 110mm fine thread bolts using loctite and tightened to 60 lb ft. It is very important that the gasket is fitted between the two, and some additional sealer where the selector shaft extends into the bellhousing will prevent any oil leak from the gearbox.

2.9 The clutch slave cylinder and integral release bearing is pre-fitted into the bellhousing at the factory. This should not be removed as the rear seal is inevitably damaged in the process.

10A. 3. Fitting Engine/Gearbox to Car

Before fitting the engine into the chassis the battery must be fitted onto its mounting on the lower chassis rails immediately in front of the right-hand footbox, with its positive connection forward.

3.1 The gearbox/bellhousing assembly must be fitted into the car independently of the engine as due to the width of the Vauxhall unit it must be twisted in order to clear the upper engine bay diagonals. The engine can be fully kitted before installation, though the engine mountings must be left off at this point and therefore also the alternator.

INSTALLATION OF VAUXHALL ENGINE

Before fitting the gearbox, two operations must be carried out.

i) Firstly the transmission tunnel top must be removed by releasing the four screws that hold it into place.

ii) Secondly, check that the holes provided in the chassis to which the gearbox mounting attaches have been slotted to a width of 9/16", and if not do so using a suitable round file. This is done to provide a small degree of lateral adjustment of the gearbox in the chassis since tolerances within the transmission tunnel are tight, and if the gearbox contacts the walls of the tunnel vibration will be transmitted through the car.

3.2 Insert the gearbox assembly into the transmission tunnel, taking care to avoid touching the fragile speedometer drive unit against the chassis, and slide it back with the tailshaft housing sliding over the end of the propshaft. It may be necessary to twist the propshaft slightly before the splines engage.

Continue to slide the gearbox rearward until its mounting locates onto the rearmost (lower) mounting provided in the chassis. Place some support under the bellhousing so that the gearbox is raised above level at the bellhousing end to accept the engine when lowered into place. Secure the gearbox mounting to the chassis with the 2, 5/16" x 1" bolts and nylocs, but do not tighten at this stage as final positioning will take place once the engine has been installed..

3.3 Fit the metal/rubber engine mountings to the chassis rails

INSTALLATION OF VAUXHALL ENGINE

using 4 5/16" x 2³/₄" bolts, washers and nylocs. Do not fit the mountings themselves to the engine block at this stage as they will foul the chassis and steering column while the engine is being fitted.

Using a suitable hoist, lower the engine into the chassis taking great care to avoid damaging the paint on the chassis tubes. We recommend protecting the upper engine bay diagonals with masking tape to avoid damage. It may be necessary to turn the crankshaft using the bolt on the front pulley in order to get the gearbox first motion shaft to align with the clutch. It will be necessary to twist the engine to one side as it is lowered into place in order that the webs on the rear of the cylinder block can fit between the upper engine bay diagonals, so we advise that you have some extra manpower on hand at this point.

When the engine slides into place onto the bellhousing, connect the two together using 6, M12 x 40mm bolts with springwashers where possible, Loctite where not, and 1, M12 x 60mm bolt which passes through the engine flange to secure the top of the starter motor.

With the engine still suspended, attach the exhaust manifold and engine mountings to the cylinder block. The exhaust manifold must be fitted before the left-hand engine mounting since it is impossible to fit with the mounting in place. Attach the manifold using the gasket to the studs on the engine securing with M8 plain nuts and lockwashers. The left-hand mounting is

INSTALLATION OF VAUXHALL ENGINE

then attached using 2, M10 x 25mm and 1 M10 x 45mm bolt into the rearmost position. The right-hand mounting fitment varies according to whether a dry or wet sump system is installed.

i) Wet sump: Attach the mounting to the block using 2, M10 x 45mm bolts and position the two cylindrical aluminium spacers provided between the mounting and the cylinder block.

ii) Dry sump: The mounting is secured through the oil scavenge pump, so the two bolts holding this to the block must first be removed. When doing this take care to ensure that the two spacing washers between this casing and the block do not drop out, or if they do, are put back as otherwise tightening the engine mounting will put unnecessary stress on this aluminium casting and change the adjustment of the toothed belt driving the oil pump. Fit the mounting to the block using 2, M10 x 45mm bolts.

3.4 The engine can now be lowered onto its mountings and secured with two large 1/2" UNF x 2¹/₂" bolts and lockwashers. If the engine mountings do not align it may be necessary to undo the bolts holding the rubber mounts to the chassis rails temporarily to get a little more movement. It also helps to keep a trolley jack under the engine to facilitate alignment.

Finally the gearbox can be adjusted in the tunnel using its slotted mountings, to achieve equal clearance on both sides within the transmission tunnel, and its mounting bolts tightened.

INSTALLATION OF VAUXHALL ENGINE

At this point the bonnet lid should be trial fitted and the alignment of the carburettors in the bonnet aperture checked. See Section 10.3.4 for instructions to adjust this, and 10.3.11 for fitment of the gearlever.

10A.4 Connection of Ancillaries

4.1 Connection of dry sump oil system.

There are two braided oil pipes provided which are the main feeds to and from the oil tank. The pipe marked 70105 has one 45 degree and one 90 degree union and is connected between the scavenge pump on the right-hand side of the engine block and the right-hand union on top of the oil tank. The 90 degree union fits to the oil tank.

The second pipe marked 70106 has two 90 degree connections and fits between the sump itself and the bottom left-hand side of the oil tank, providing the main oil feed to the engine.

The oil tank should be filled with oil, we recommend a synthetic Shell Gemini or Mobil 1. Ensure that the tank is filled to within approximately 5" from the top which amounts to about 8 pints of oil. Do not allow the level to fall below 2/3 full (about 5 pints) or some surge could be encountered under hard cornering. On the other hand over filling will lead to excess oil being blown messily out of the breather. The oil level in a dry sump system can only be checked with the engine running.

The left-hand union on top of the oil tank should be connected to the breather outlet on the front right-hand side of the cam

INSTALLATION OF VAUXHALL ENGINE

cover using the rubber hose provided secured with Jubilee clips.

The final connection is to fit another rubber hose to the aluminium union emerging from the side of the top cover of the tank and trim to length so that it breathes to atmosphere adjacent to the bottom of the gearbox.

4.2 Clutch Connection

The normal wet sump installation uses a cable clutch mechanism similar to that used in Ford powered Sevens, except that it is capable of being adjusted from both ends. Please refer to section 3.5 of section 10 but note that it should be adjusted so that the minimum amount of the outer cable enters the pedal box.

If the dry sump has been specified the nylon hose must be fitted between the master cylinder on the pedal box and the threaded hole on the right-hand side of the bellhousing.

The clutch master cylinder should be filled with brake fluid and having loosened the bleed screw, bled using long steady strokes of the clutch pedal until the fluid emerging is free from bubbles. Tighten the bleed screw and check that the pedal operates the clutch correctly. The clutch itself is self-adjusting although the pedal location can be adjusted along with that of the brake pedal (see section 17). The use of silicon clutch fluid is not recommended.

4.3 Electrical Connections

i) The alternator is fitted to the left-hand engine mounting

INSTALLATION OF VAUXHALL ENGINE

bracket where it is located by the horizontal tube running parallel to the engine. Attach the alternator using a 5/16" x 5" bolt and nyloc.

The adjusting strap is attached to the hexagonal block already bolted to the engine using a 3/8" bolt and lockwasher, and to the alternator by an M8 x 25mm bolt with both a plain and lockwasher. Fit the alternator drive belt and tighten by swinging the alternator away from the engine until there is no more than 1/2" movement in the belt.

ii) The live battery connection is effected using the short red lead between the positive terminal and the starter solenoid. The earth strap connects between the negative terminal on the battery and the adjacent engine to bellhousing bolt. It may be necessary to increase the size of the hole in the strap to accomodate this M12 bolt.

NB: Do not actually connect this earth lead to the battery until all electrical equipment is installed and connected and the car is ready to run.

The engine in turn is earthed to the chassis at the three way union below the brake master cylinder and to the rearmost inlet manifold fixing bolt.

iii) Other electrical connections are as follows:

Alternator	Brown and Brown/Yellow in plastic connector Black/Brown battery sensor to B+
Water temperature sensor	Green/Blue

INSTALLATION OF VAUXHALL ENGINE

Oil pressure sensor	White/Orange
Distributor	This connects directly to the coil factory fitted on the bulkhead.
Crankshaft sensor	Connects to socket adjacent to 3 way union on main loom

4.4 Exhaust System

The Vauxhall exhaust system runs underneath the car unlike the Ford system which emerges from through the side panel. The manifold will already have been attached prior to fitting the left-hand engine mounting.

Attach the single pipe with its four into one collector to the manifold using four 5/16" x 1¹/₄" bolts and ensure that the correct gasket is used in the joint. Do not fully tighten at this stage.

Fit rubber bobbins to the forward hole in the left hand silencer mounting bracket and the rearward hole in the right hand bracket, located underneath the boot area at each side of the fuel tank. These bobbins are secured ABOVE each bracket and the silencer/tailpipe assembly is fitted on top of the bobbins and secured using 5/16" nuts and lockwashers.

Slide the two exhaust clamps over the forward ends of the silencer, and slot the twin pipes and collector on to it locating the front end onto the one into two flange. Attach the flanges together using two 3/8" x 1¹/₂" UNF bolts and the appropriate gasket and ensure that the system is correctly aligned, and that no parts of the system are in contact with the chassis or under strain, before tightening the flanges and

INSTALLATION OF VAUXHALL ENGINE

clamps. We recommend the use of "Firegum" or equivalent in the joints to ensure that there is no leakage of exhaust gases.

4.5 Cooling System

Refer to section 10.6.1 for the fitment of the cooling fan and 10.6.2 for the radiator. The radiator itself is fitted with a bleed screw which must be positioned at the top, and also with a blanking plug which must be positioned to face rearwards. This plug is removed and a thermostatic fan switch fitted in its place, to which the black/green and purple wires are connected.

The bottom radiator hose is in two sections with a metal 'Submarine' section tube in between fitted with two conning towers. The 'J' shaped hose is connected to the water pump on the right-hand side of the engine block, and the smaller bleed outlet from the 'Submarine' piece should face inwards. The correct location of the other two hoses is evident from their shape but note that the bottom hose has a front and a back and offers significantly better clearance to the steering rack when correctly fitted. It is important to ensure that no chaffing is possible between the lower forward hose and the steering rack and the rear lower hose and the water pump casing.

The other connection into the 'Submarine' piece is for the heater, refer to section 14.1 for details. The heater return feed is connected into the back of the cylinder head.

The plastic expansion bottle is located on top of the cruciform immediately behind the radiator where a vertical post with a

INSTALLATION OF VAUXHALL ENGINE

rubber insert positions it correctly. It is held by two brackets which attach to the studs which hold the fan cowl in place, and which are in turn attached to the expansion bottle by two 1/4" x 3/4" bolts and nylocs. The rear mounting on the bottle must be cut off taking care not to make it too short and hence cause it to leak. (see Fig 10A.4.5)

The underside of this bottle is connected to the 'Submarine' piece with a rubber hose cut to length, and a second thinner hose runs backwards from the top of the bottle to the bleed connection at the front of the inlet manifold.

The cooling system should be filled with a 33% antifreeze solution, and carefully bled with the engine running and the bleed valve on the radiator loosened.

4.6 Fuel System

The fuel system is complete except for the attachment of the fuel pipe to the connection on the front carburettor using the short piece of rubber tubing supplied and the two clips.

4.7 Throttle and Speedometer cables

i) Please refer to Section 10.3.7 for instructions on fitting the throttle cable noting that the attachment to the carburettors uses a ball joint which clips together and is secured using a cylindrical clip in the same way as the other end is attached to the throttle pedal.

ii) The speedometer cable should be fed through the large

INSTALLATION OF VAUXHALL ENGINE

grommet above the steering column in the front bulkhead and connected to the back of the speedometer where it is hand tightened.

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

pipes and slide on the 'Y' piece which turns the system through 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

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

should be hooked by a jubilee clip around the tailpipe.

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.

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

We are now able to supply the same range of engines sold in our Component cars to kit car customers although Vauxhall HPC engines are only available to customers buying the HPC kit in CKD form. Please refer to Section 2 of this Guide for full details. Engines supplied by us are new, not rebuilds and include all ancillaries including starter, alternator and fuel pump.

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 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 and are able to provide these items on better terms than a Ford dealer.

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

- 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 1³/₄" 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

Before installing the engine the battery must be fitted see 9.4.3

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 1³/₄" 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 ³/₄" 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 all its ancillaries including carburettors, fuel pump, starter motor etc then do so now. (Please see 10.7 for electrical connections and 10.6 for the cooling system)

It is possible that some adjustment to the engine positioning will be necessary in order to gain sufficient clearance and correct fitting of carburettors and the exhaust system (see 10.8). Twin DCOE carburettors are a close fit through the bonnet aperture as is the exhaust system through its hole in side panel and furthermore clearance between the exhaust manifold and the upper engine bay diagonals is tight.

Adjustment can be performed as follows:

a) By fitting 1/2" washers between the engine mounting brackets and the engine mounting rubbers on both sides to lift the engine or on only one side to raise and twist the engine.

b) By cutting off a portion from the bottom of the vertical tubes of the engine mounting brackets, on both sides to lower the engine and on one side to lower and twist the engine.

Please note that the amount of adjustment likely to be needed is

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

small and it should not be necessary to remove more than 1/8" from a mounting or add more than two 1/16" washers. On most cars no adjustment will be needed, if more than the above small modifications appear necessary please contact Caterham cars. However, the use of a non standard inlet manifold or exhaust manifold will cause problems hence we supply an exhaust with the kit, and our recommendation in Section 2 regarding the inlet when using DCOE's.

3.5 The clutch cable should be fitted by feeding its inner through the bush provided in the bellhousing and hooking the nipple onto the clutch arm. The other end fits into the pedal box, the inner cable being bolted to the top of the clutch pedal.

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. LHD cars are fitted with hydraulic clutch mechanisms see 3.9.

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

3.6 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, where it is hand tightened.

3.7 The throttle cable should be connected at the carburettor end first. With twin Weber DCOE's it feeds upward from underneath, its outer cable being located by the bracket connecting the two carburettors, and the nipple is attached to the throttle lever using the throttle 'barrel' which is both drilled, slotted and provided with a recess to take the nipple.

Push the barrel half way through the end of the lever and slot the inner cable into it, allowing enough slack to keep the nipple clear, then push the barrel fully home. The inner cable is pulled down until the nipple locates in the recess in the barrel. Attach the 'Hairpin' throttle spring between the outer cable locating bracket and the throttle lever bending the end of the spring over to prevent it coming out or fouling the body of the carburettor. (NB. The cable should not pass around the steering column nor lay across the battery)

The other end of the outer cable is threaded to allow adjustment and has two nuts threaded onto it for this purpose. The nipple on the inner cable is held onto the accelerator pedal using a special clip. The pedal position is adjustable there being two mounting points to which it can be attached, and having chosen one suited to your ideal driving position, the throttle cable can be adjusted. It is important when adjusting the

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

cable to make certain that the carburettor butterflies are fully open when the pedal just reaches the extent of its travel and that with the pedal released the butterflies are closed. The pedal box diagram in 6.5 may be useful.

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

With left hand drive cars fitted with DCOE carburettors the cable actually fits the other way up, the inner cable attaching to the fixed bracket and the outer to the lever.

3.8 Hydraulic Clutch Installation (LHD only)

The pedal box is fitted with a second master cylinder to which is attached a steel brake pipe. Attach the flexible hose provided between the union on this pipe and to the slave cylinder fitted to the bellhousing in place of the clutch cable, tighten both unions ensuring the pipe is not stretched or twisted.

Fill the master cylinder with brake fluid and having loosened the bleed nipple bleed the system using slow strokes of the pedal. To bleed the system fully it will be necessary to twist the slave cylinder during bleeding so that the bleed nipple is on a level with the input pipe.

To adjust the clutch, pull back the rubber cover over the adjusting rod and screw the rod in or out accordingly so that the the "bite" point is correct (see 3.5).

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

3.9 The fuel pipe should be attached to the fuel pump input union on the right hand side of the engine securing by crimping the clip with pincers. Alternatively, a Jubilee type clip can be used. The fuel pipe is deliberately supplied over length so will need to be shortened.

3.10 A rubber engine breather pipe needs to be fitted to the plastic breather box fitted to the right hand side of the engine. This should be routed vertically upwards for about 9" and then tucked down between the gearbox and the transmission tunnel and trimmed to length as appropriate.

3.11 The gearlever is attached to the top of the gearbox tailshaft housing using three screws. Refit the transmission tunnel top and with the gearlever in neutral fit the aluminium plate to which the gearlever gaiter is attached. Check that this cannot obstruct the gearlever from finding all the gears and rivet into position. Screw the Gearlever Knob into place.

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

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

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 to select reverse gear.

4.5 Engine mountings and ancillaries are fitted in the same way as in 10.3 though since live axled cars do not have the sealed pedal box and adjustable pedals of De Dion cars the throttle pedal fixing is different.

The outer cable is bolted to the small bracket rising from the front of the pedal box and the inner end has an eyelet which is bolted to the end of the pedal. Do not fully tighten this so that the cable can pivot around the end of the pedal. Please refer to 10.3.4. for instructions for attaching the cable to the carburettors.

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 under the chassis to take the gearbox mounting. Offer the crossmember into the transmission tunnel sliding back until its legs contact the front face of the existing 5 speed crossmember. Using the holes in the crossmember for reference mark and drill two 1/4" holes through the chassis rail, securing with 1/4" x 1 1/2" 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

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

from taking the strains imposed by gearchanging.

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 The electric cooling fan assembly is fitted using three 6mm nyloc nuts screwed onto studs which form part of the motor. The motor hangs by two of its studs from a bracket below the chassis cross tube at the front of the engine bay and is located at the bottom by a separate small bracket which is itself bolted to the lower crossmember which holds the steering rack. (see recognition sheet at rear of Section 2)

The wiring connections match those provided in the wiring loom but 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 Caterham Cars or an automotive electrician. Before going

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

further, the battery **MUST** be disconnected. (refer to diagram 10.7 and the wiring diagram at the rear Section 17)

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 you are using a non Caterham alternator (e.g. Lucas) there will be no B+ terminal, in which case this wire should be taped back into the loom.

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 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

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

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 white/brown wire in the black sleeve 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.

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

INSTALLATION OF ENGINE GEARBOX AND COOLING KIT

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, forwards around the lower engine bay diagonals in front of the engine and back again along the opposite bottom chassis tube to the starter. Secure in place with tywraps.

DO NOT CONNECT THE EARTH AT THIS STAGE

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 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

Dry Sump Bell Tank Housing

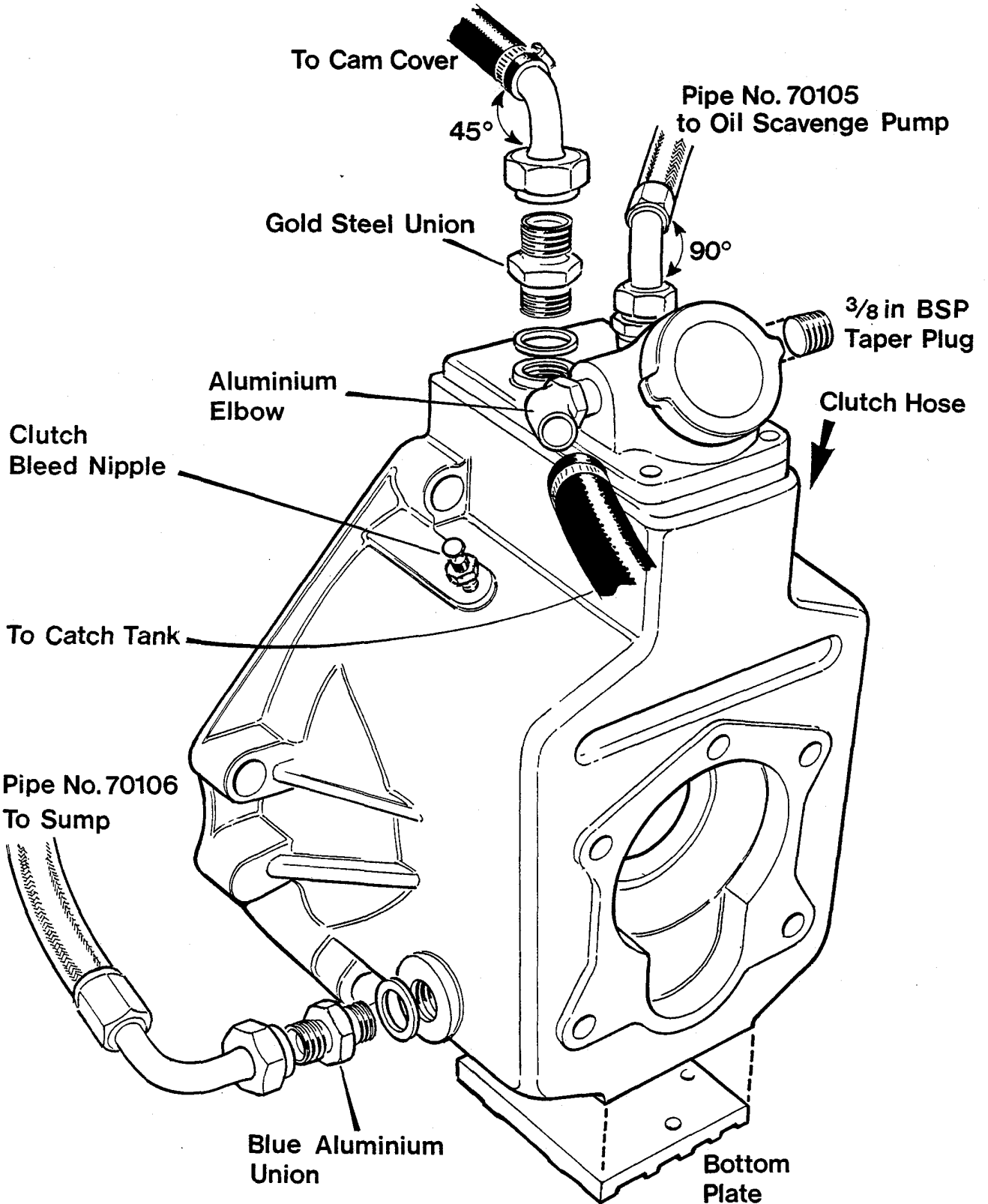


Fig. 10A.2

Expansion Bottle Installation

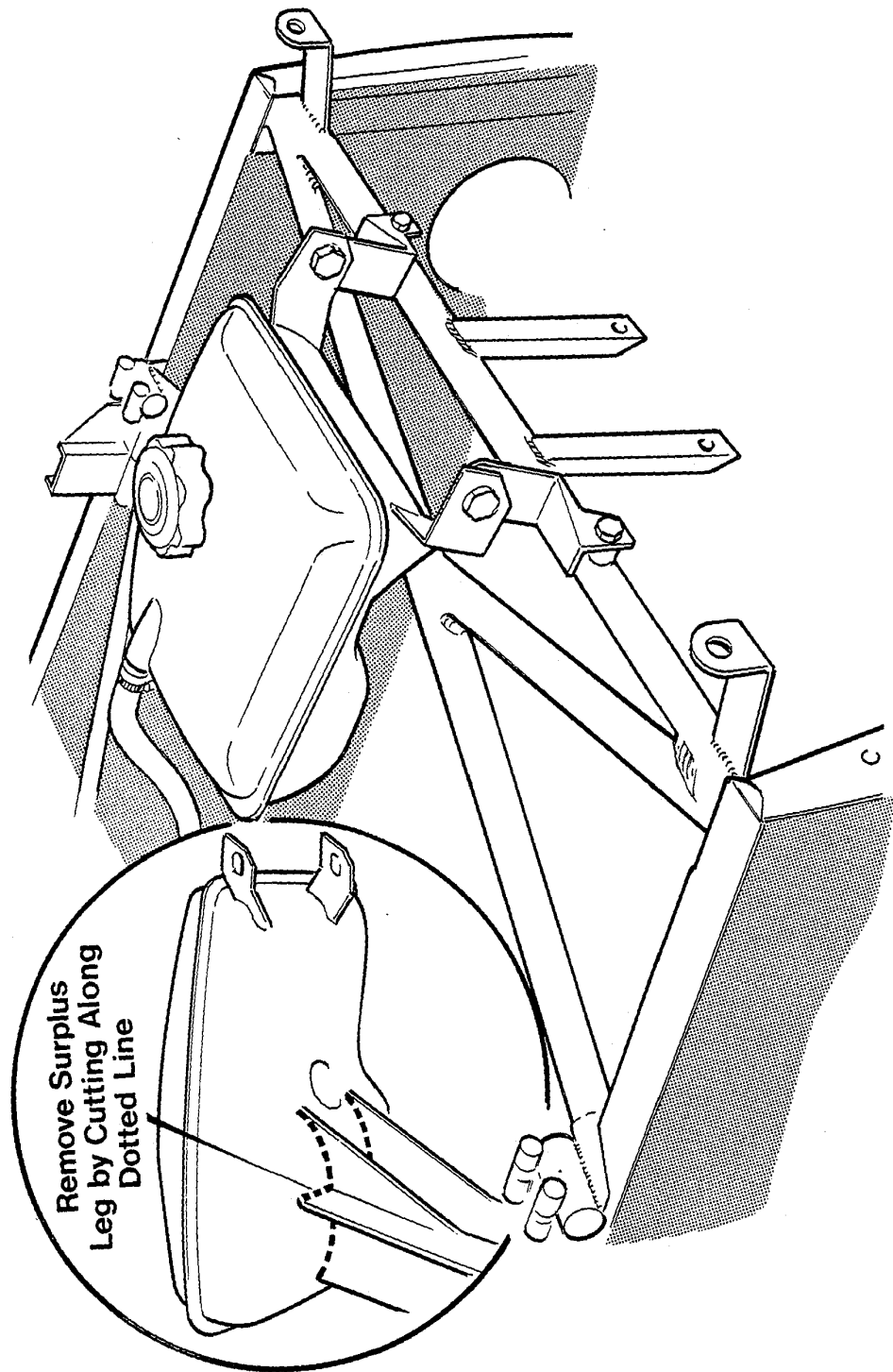


Fig. 10A.4.5

INSTALLATION OF ROVER ENGINE

Although this section is broadly similar to Section 10 and 10A of the Assembly Guide, there are some key differences between the Rover DOHC 16 Valve "K" Series engine installation and that for the Vauxhall and Ford derived engines. In order to avoid duplication, please refer to section 10 in conjunction with this section.

10B.1. Assembly of Gearbox Kit - Five-Speed XR4i

The Rover powered car uses the same Ford gearbox though with a different bellhousing which eliminate the need for an adaptor between the bellhousing and gearbox.

Follow the gearbox build up instructions in 10.1. with the exception therefore of 10.1.2. where the bellhousing bolts directly to the front of the gearbox, noting that the gasket still needs to be used. Tighten the M12 x 40mm fine thread bolts to 60 lb ft and use loctite to ensure they do not work loose.

Note also that though the clutch mechanism uses the same components as the Ford installation, the rubber gaiter which prevents dirt from entering the bellhousing is not provided with a metal clip to hold it in place. This is not considered necessary in view of the dimensions of the bellhousing.

INSTALLATION OF ROVER ENGINE

10B.2. Fitting Engine/Gearbox to Car

Before fitting the engine into the chassis the battery must be fitted onto its mounting on the lower chassis rails immediately in front of the right-hand footbox, with its positive connection forward (Unless a master switch is to be fitted, in which case the battery fits with its negative connection forward).

2.1 The gearbox/bellhousing assembly must be fitted into the car independently of the engine as due to the width of the Rover unit it must be twisted in order to clear the upper engine bay diagonals. The engine as supplied from Caterham has its engine mounting brackets already fitted, and these must be removed (along with the alternator on left hand drive cars) before installation can be attempted. Take care that you retain the correct fixings with each bracket as they are different on each side and not interchangeable. Otherwise the engine can be fully kitted before installation.

2.2 Insert the gearbox assembly into the transmission tunnel, taking care to avoid touching the fragile speedometer drive unit against the chassis, and ease it back with the tailshaft housing sliding over the end of the propshaft. It may be necessary to twist the propshaft slightly before the splines engage.

Continue to slide the gearbox rearward until its rubber mounting locates onto the cross-member provided in the chassis. Place

INSTALLATION OF ROVER ENGINE

some support under the bellhousing so that the gearbox is raised above level at the bellhousing end to accept the engine when lowered into place. Secure the gearbox mounting to the chassis with the 2, 5/16" x 1" bolts and nylocs, but do not tighten at this stage as final positioning will take place once the engine has been installed.

2.3 Fit the metal/rubber engine mountings to the chassis rails using 4 5/16" x 2³/₄" bolts, washers and nylocs.

Using a suitable hoist, lower the engine into the chassis taking great care to avoid damaging the paint on the chassis tubes. We recommend protecting the upper engine bay diagonals with masking tape to avoid damage. It may be necessary to turn the crankshaft using the bolt on the front pulley in order to get the gearbox first motion shaft to align with the clutch. It will be necessary to twist the engine to one side as it is lowered into place in order that the webs on the rear of the cylinder block can fit between the upper engine bay diagonals, so we advise that you have some extra manpower on hand at this point.

When the engine slides into place onto the bellhousing, connect the two together using 4 M12 bolts with springwashers. Two 40mm bolts pass forward from the top of the bellhousing into the back of the cylinder block and two 60mm bolts with plain as well as spring washers pass backwards through the "ears" on the bearing ladder of the engine into the bellhousing. Note that the battery earth lead is connected to the right hand of these

INSTALLATION OF ROVER ENGINE

60mm bolts.

With the engine still suspended, loosely attach the exhaust manifold and engine mountings to the cylinder block. The standard exhaust manifold must be fitted before the left-hand engine mounting since it is impossible to fit with the mounting in place, but fitment of the competition variety (see Section 14.5) can be done later. Attach the manifold using the gasket to the 4 M10 studs on the engine securing with nuts and lockwashers and use one M10 x 30mm caphead setscrew on the rearmost fixing. Both engine mountings are then attached using the correct fixings removed earlier, the right hand mounting using M10 x 55mm bolts and Loctite, while the left hand mounting uses M10 x 30mm bolts with lockwashers. The engine earth strap is attached to the upper right hand engine mounting bolt.

2.4 The engine can now be lowered onto its mounting rubbers and secured with two large 1/2" UNF x 2¹/₂" bolts and lockwashers. The brackets can now be fully tightened to a torque of 25 lb ft, and the engine released from its hoist. It also helps to keep a trolley jack under the engine to facilitate alignment.

The starter motor can now be attached to the bellhousing on the left hand side of the engine using M10 x 55mm bolts through the special aluminium spacer designed by Caterham to adapt the "K" Series starter motor to the Caterham bellhousing.

Finally the gearbox can be adjusted in the tunnel using its slotted mountings, to achieve equal clearance on both sides

INSTALLATION OF ROVER ENGINE

within the transmission tunnel, and its mounting bolts tightened. Check this carefully as clearances are tight and poor alignment can cause the gearbox to contact the chassis under cornering leading to a heavy vibration.

The gearlever can now be fitted along with the transmission tunnel top and its gaiter, see 10.3.11 and 12.4 for the necessary instructions.

10B.3 Connection of Ancillaries

3.1 Clutch Connection

The clutch cable should be fitted by feeding its inner through the yellow plastic bush provided in the bellhousing and hooking the nipple onto the clutch arm. The other end fits into the pedal box, the inner cable being connected to the top of the clutch pedal by a clevis pin. This pin must be fitted with its head on the inboard (transmission tunnel) side, and secured with the split pin provided.

The cable is fitted with adjusting screws at both ends so that it can be adjusted both at the bellhousing and at the pedal box. Set the pedal box end so that a minimum length of outer cable protrudes past the location bush into the box itself and adjust the bellhousing end until a satisfactory clutch pedal position is achieved. The "bite" point should be set according to personal preference but take care to ensure that it is not so adjusted as to prevent the clutch from fully engaging or disengaging.

INSTALLATION OF ROVER ENGINE

3.2 Electrical Connections

The engine is supplied with its own wiring harness which needs to be connected to that provided on the car as below. All connecting plugs are in matched pairs which are not interchangeable with each other so it should not be possible to connect the loom incorrectly.

- 1) Attach two plugs, one 36 pin and one 18 pin, to the electronic control unit (ECU)
- 2) Attach two plugs, one 8 pin and one 6 pin , to the multi-function unit (MFU)
- 3) Attach one 3 pin plug to the inertia switch
- 4) Attach one 13 pin plug to the main vehicle loom
- 5) Attach the brown lead on the engine loom to the purple lead in the main vehicle loom.
- 6) Attach one 3 pin plug to the Oxygen sensor (Lambda probe) in the exhaust system (not fitted on competition systems)
- 7) Attach one 2 pin plug to the charcoal cannister (only on catalyst fitted cars) There is also a grey two way plug located under the plenum chamber which is not used.
- 8) Connect the red/white lead to the starter
- 9) Attach the black lead in the engine loom to the negative battery terminal
- 10) Attach the ring terminal on the black battery earth lead to the lower offside engine to bellhousing bolt (if not already attached in 2.3 above). The live battery connection is effected using the red lead between the positive terminal on the battery to the starter solenoid, routing the cable forward along the lower chassis diagonal and around the tubing in front of the

INSTALLATION OF ROVER ENGINE

engine and back down the opposite chassis rail to the starter solenoid. The cable should be secured to the top of the chassis tubes with tywraps. Keep well clear of the exhaust manifold.

NB: Do not actually connect the earth lead to the battery until all electrical equipment is installed and connected and the car is ready to run.

The engine in turn is earthed to the chassis at the foremost bolt attaching the right hand engine mounting rubber to the chassis rail.

4.3 Exhaust System

The standard Rover exhaust system runs underneath the car unlike the Ford system which emerges from through the side panel. The manifold will already have been attached prior to fitting the left-hand engine mounting. Should the competition system have been specified, this section should be ignored and you should refer instead to Section 14.5, Optional Extras.

Attach the down pipe to the manifold using 3/8" x 1¹/₂" bolts washers and nuts. Do not fully tighten at this stage. Should a catalytic converter have been specified this will be fitted by the factory when the car is brought in for its post build check.

Fit rubber bobbins to the forward hole in the left hand silencer mounting bracket and the rearward hole in the right hand bracket, located underneath the boot area at each side of the fuel tank. These bobbins are secured ABOVE each bracket and the silencer/tailpipe assembly is fitted on top of the bobbins and

INSTALLATION OF ROVER ENGINE

secured using 5/16" nuts and lockwashers.

Slide the two exhaust clamps over the forward ends of the silencer, and slot the twin pipes and collector on to it locating the front end onto the one into two flange. Attach the flanges together using two 3/8" x 1¹/₂" UNF bolts and the appropriate gasket and ensure that the system is correctly aligned, and that no parts of the system are in contact with the chassis or under strain, before tightening the flanges and clamps. We recommend the use of "Firegum" or equivalent in the joints to ensure that there is no leakage of exhaust gases.

4.4 Cooling System

Refer to section 10.6.1 for the fitment of the cooling fan and 10.6.2 for the radiator. The radiator itself is fitted with a bleed screw which must be positioned at the top, and also with a blanking plug which must be positioned to face rearwards. This plug is removed and a thermostatic fan switch fitted in its place, to which the black/green and purple wires are connected.

The bottom radiator hose is in two sections with a metal 'T' section tube in between. The 'J' shaped hose is connected to the water pump on the right-hand side of the engine block, and the small bleed outlet from the 'T' piece should face inwards. The correct location of the other two hoses is evident from their shape but note that the bottom hose has a front and a back and offers significantly better clearance to the steering rack when correctly fitted. It is important to ensure that no chaffing is possible between the lower forward hose and the

INSTALLATION OF ROVER ENGINE

steering rack and the rear lower hose and the water pump casing.

When attaching the top and bottom hoses to the radiator note that the inlet and outlet tubes are longer than might be expected and swaged at their ends. When securing with Jubilee clips ensure that these clips are fitted immediately behind the swages and not hard up against the radiator itself.

The plastic expansion bottle is located on top of the cruciform immediately behind the radiator where a vertical post with a rubber insert positions it correctly. It is held by two brackets which attach to the studs which hold the fan cowl in place, and which are in turn attached to the expansion bottle by two 1/4" x 3/4" bolts and nylocs. The rear mounting on the bottle must be cut off taking care not to make it too short and hence cause it to leak. (see Fig 10A.4.5)

The underside of this bottle is connected to the 'T' piece with a rubber hose cut to length, and a second thinner hose runs backwards from the top of the bottle to the bleed connection at the front of the inlet manifold.

The heater (if fitted) is connected between the outlet on the water pump on the right hand side of the engine and the water rail which runs parallel to the cylinder head on the left hand side of the engine.

The cooling system should be filled with a 33% antifreeze solution, and carefully bled with the engine running and the bleed valve on the radiator loosened. The system will hold

INSTALLATION OF ROVER ENGINE

approximately six pints of water/antifreeze mix.

4.5 Fuel System

The fuel system is complete except for the attachment of the fuel feed and return pipes to the injection system. The high pressure fuel feed from the pump, already fitted at the rear of the vehicle, is via a metal pipe running through the transmission tunnel which is fixed to the union on the rubber fuel hose on the engine. The low pressure return flow is via the second rubber hose, without a union, which pushes onto the black nylon pipe also located in the transmission tunnel, secured with a crimped clip.

4.6 Throttle and Speedometer cables

i) The throttle cable should be attached to the engine end first, and connects to the throttle body by engaging the nipple in the throttle operating lever and then clipping the square shaped black plastic adjuster onto the adjacent bracket.

The cable is then posted through a "p" clip mounted on the side of the engine plenum casing to prevent it rattling against the underside of the bonnet and then turned back on itself to the pedal box. Pass the cable through the 22mm hole in the front of the pedal box and secure the outer cable to it using the circlip. The inner cable is clipped into the slot on top of the pedal, which is gently squeezed with a pair of pliers to capture it and is secured in place by the clip which fits over the top, (see diagram in section 6.5).

INSTALLATION OF ROVER ENGINE

ii) The speedometer cable should be fed through the large grommet above the steering column in the front bulkhead and connected to the back of the speedometer where it is hand tightened.

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.

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 The reversing lights are bolted to the rear wings using 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.

The live green/brown wire from the light unit is connected to the green wire on the main wiring loom using the bullet connectors provided.

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

ATTACHMENT OF LIGHTING KIT

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 2¹/₂" 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.

11.4. Rear Number Plate Lamp

4.1 Dismantle the lamp unit and note that there are two round and two square holes provided in its metal base. The upper square holes are used to secure the unit to the spare wheel carrier and one of the round holes will align with a similar one on the carrier to take the feed wire. It will be necessary to

ATTACHMENT OF LIGHTING KIT

pierce the rubber backing before fixing, using two 5mm x 16mm posidrive screws nuts and lockwashers.

4.2 Feed the red wire through from the loom into the back of the unit and stripping back just sufficient insulation, attach to the screw connection provided in the centre of the light unit. The number plate light is earthed through its base so no other 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 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 which consists of 4 wires terminating in bullet connectors, should be fed upward through the centre of the mounting stem into the headlamp itself where it can be connected to the short sub-loom provided. Take care to match the main loom colours with those of the sub-loom. The metal clamp and screw are not necessary.

6.6 The headlamp itself is attached to the chrome plated rims at the front of the headlamp bowls. Remove these rims by undoing the screws which only need to be undone sufficiently to

ATTACHMENT OF LIGHTING KIT

allow the rim to clip off. Noting which way up these rims fit, attach the headlight unit to the inside of the rims using three wire spring clips.

These spring clips are tight fit and may need easing slightly before they can be stretched into position. They must be fitted so that they protrude towards the front of the rim or the rim/headlamp unit will be prevented from fitting the bowl.

If the optional chromed headlamp bowls are specified the light unit is held into place by the rim which uses a clamping screw to hold it and the light onto the front of the headlamp bowl. This rim will need to be rotated in order to position the light the correct way up. You should be aware that with these bowls the wiring is a very tight fit up through the mounting stems, a little grease will help.

6.7 Connect the main headlamp wiring plugs and clip the sidelights into the back of the headlights. Hook the bottom of the rim into the lip on the headlamp bowl and swing the rim/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, but a close approximation can be achieved by positioning the car in front of a suitable wall or garage door and, having loosened the bowl securing nuts, aligning the beams to face slightly downwards and to the left.

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.

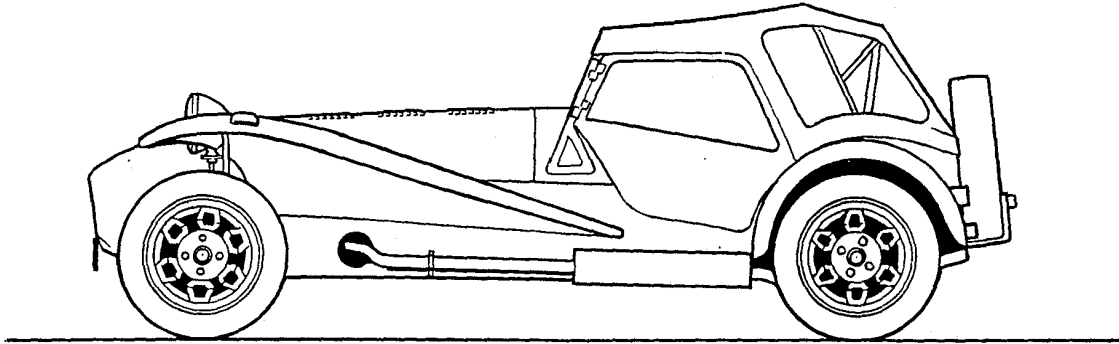
ATTACHMENT OF LIGHTING KIT

11.8. Final Testing

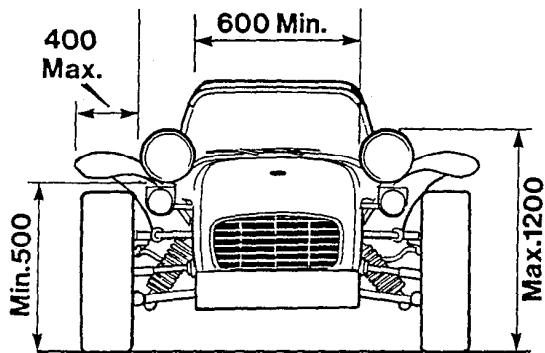
When all connections are made to the engine and the battery is installed, all the electrical functions can be checked. If there are any problems, recheck your connections and check that the bulbs have not been damaged in transit. In the unlikely event that problems persist, either contact Caterham Cars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

At the rear of section 17 there is a wiring diagram provided which may be of assistance.

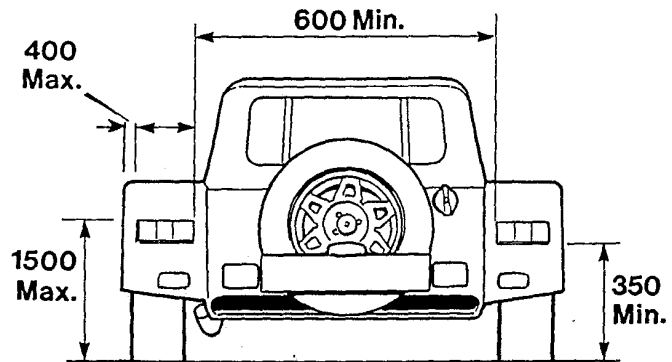
Lighting - Legal Requirements



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). Vauxhall powered cars use a different interior kit, with an integral transmission tunnel armrest, see also 12.4.

12.1A. Boot Floor Live Axle

1A.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.

1A.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.

1A.3 The fuel filler pipe can now be fitted noting that the lower Jubilee clip is tightened from the right hand wheel arch.

1A.4 The boot carpet is laid in place but will need to be cut where it fits around the fuel filler.

12.1B. Boot Floor De Dion

1B.1 This differs from Live Axle cars in that the boot floor consists of two plywood and one aluminium sections. We recommend a trial fit of these pieces before securing into place since the front and rear wooden sections are joined by the folded aluminium strip which needs to be secured first.

INSTALLATION OF INTERIOR KIT

1B.2 Position the front half of the boot board tightly up against the bulkhead and position the aluminium strip behind it with its lip under the board. Mark the position of this strip and remove the front board. Drill the strip at each end and rivet into place with four 1/8" pop rivets.

1B.3 Refit the front board and drill through it and its supports with a 1/8" drill securing with self tapping screws.

1B.4 The rear board can now be fitted in conjunction with the fuel filler pipe as described in 9.4.4. Secure this board as with the front board.

1B.5 Fit the boot carpet as in 1A.4, there is no need to use glue or fasteners to hold it in place.

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 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.

INSTALLATION OF INTERIOR KIT

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 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

INSTALLATION OF INTERIOR KIT

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 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.

INSTALLATION OF INTERIOR KIT

12.3. Seating

3.1 Before the seats can be fitted it will be necessary to fit seat belts. Lap and diagonal belts are available for Live Axle cars and Inertia reel belts for De Dion cars instructions for the fitting of which are in 9.5.5. Both types of belts available from Caterham Cars have been made specifically for the Seven so that their mountings and webbing lengths are correct.

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 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 (front), hexhead bolts (rear) 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 5/16" 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 (8mm x50mm) caphead 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.

INSTALLATION OF INTERIOR KIT

12.4 Vauxhall Cars Interior Trim

The transmission tunnel carpet on these vehicles is not in one piece, but divided into three. The two pieces of carpet are glued to the sides of the transmission tunnel, but the top piece includes both a padded armrest and the gearlever gaiter. This is secured by inserting the tab at the front end into the slot at the very front of the tunnel and by pozidrive screws into the riv-nuts pre-fitted into the top of the tunnel at the rear.

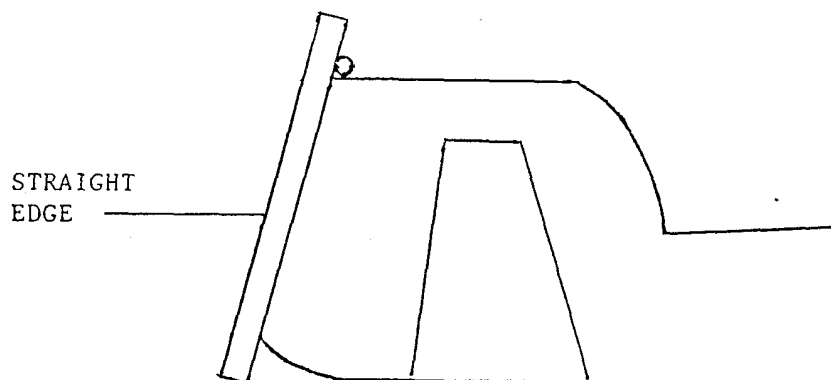
ATTACHMENT OF WEATHER EQUIPMENT KIT

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.

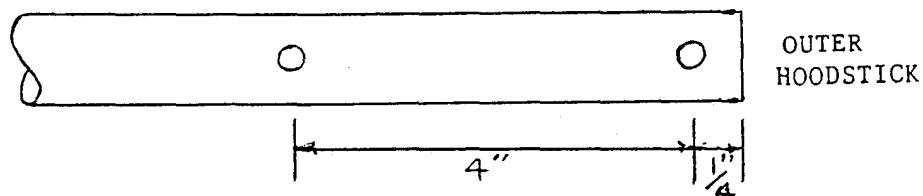
To prevent the drill from wandering off course we suggest that the hole centres are indented using a centre punch. (Failing this, a Phillips screwdriver may suffice).

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 the outer wall with a 3/16" drill.

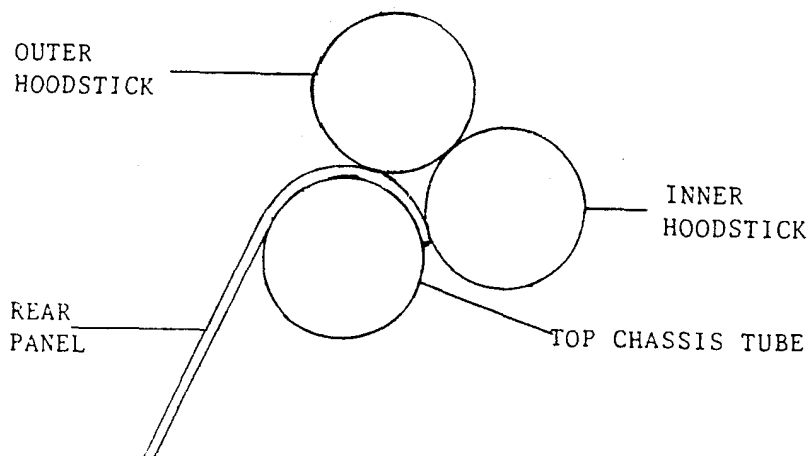


ATTACHMENT OF WEATHER EQUIPMENT KIT

1.3 Mark and drill two more 3/16" holes, through the tube, 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.



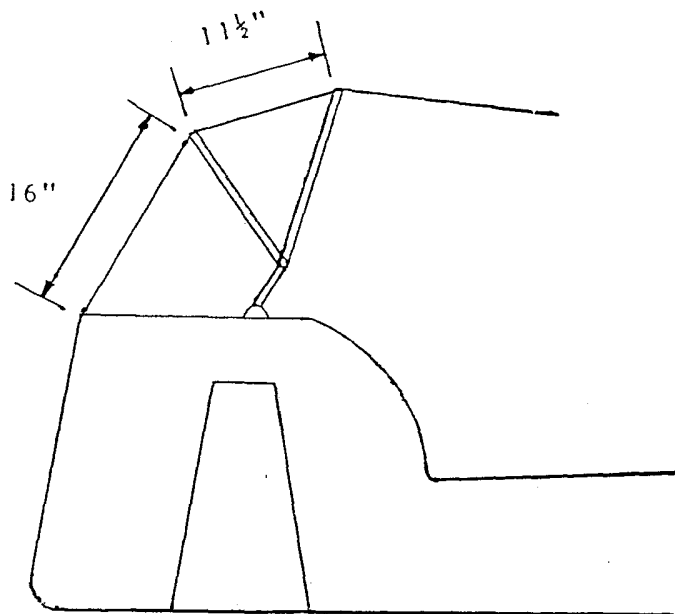
1.4 Bolt the outer stick in place using 5mm x 16mm Posidrive screws, washers and nylocs and offer up the inner hoodstick as shown on the diagram. Mark and drill the inner hoodstick with 3/16" holes aligned with those already drilled in the outer hoodstick. Bolt together with 5mm x 40mm Posidrive screws, washers and nylocs and tighten sufficiently to allow movement. Should you intend to fit a competition roll over bar this screw must be shortened so that the nut locates inside the tube.



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

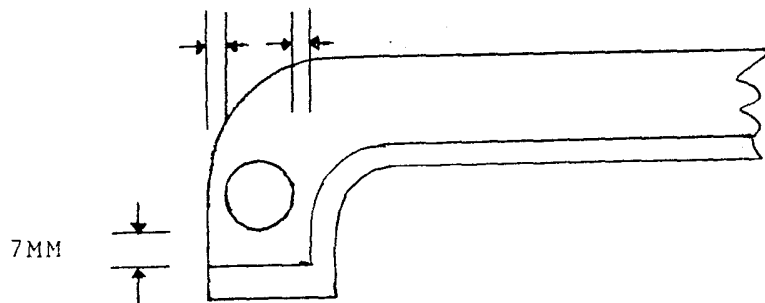
ATTACHMENT OF WEATHER EQUIPMENT KIT

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.

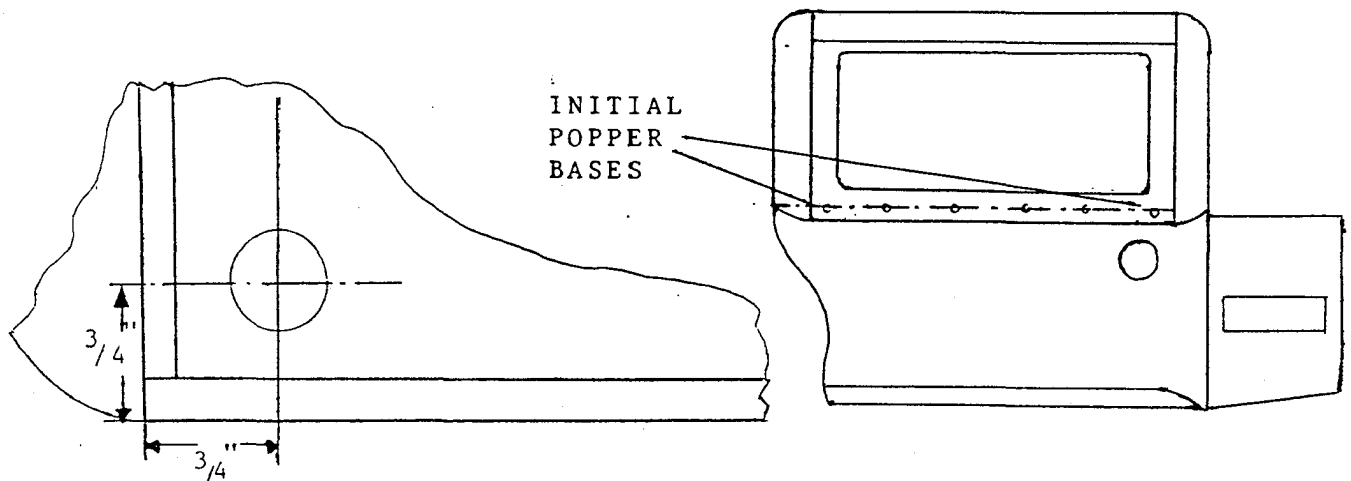


ATTACHMENT OF WEATHER EQUIPMENT KIT

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, $3/4$ " above the lower edge and $3/4$ " in from the outside of the seam.

2.4 Mark out the remaining poppers on this panel and fit them $3/4$ " 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.

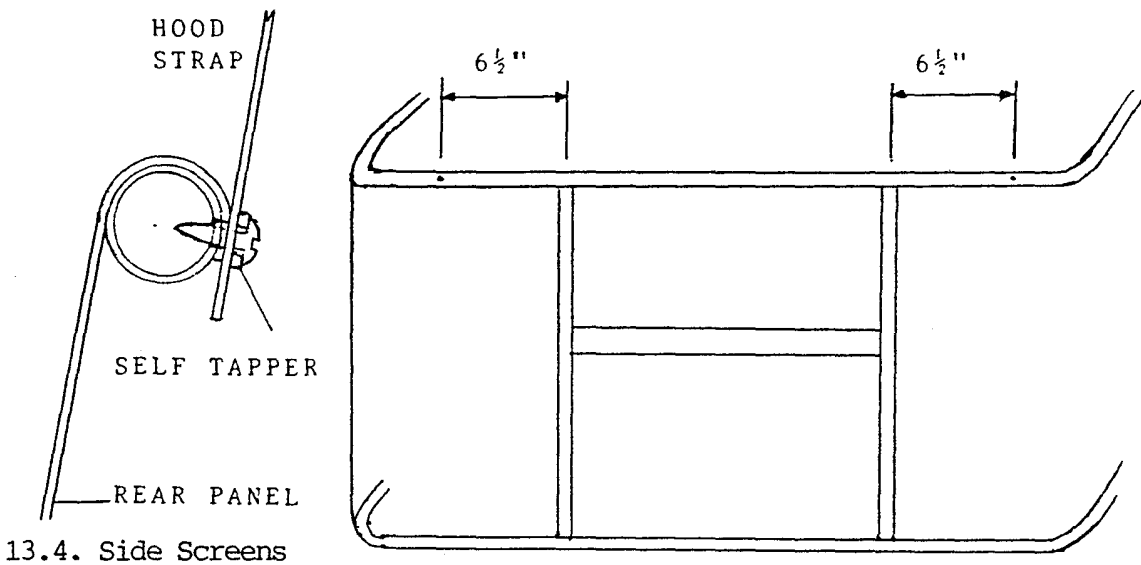
13.3. Hoodstick Adjustment

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, 6¹/₂" 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.

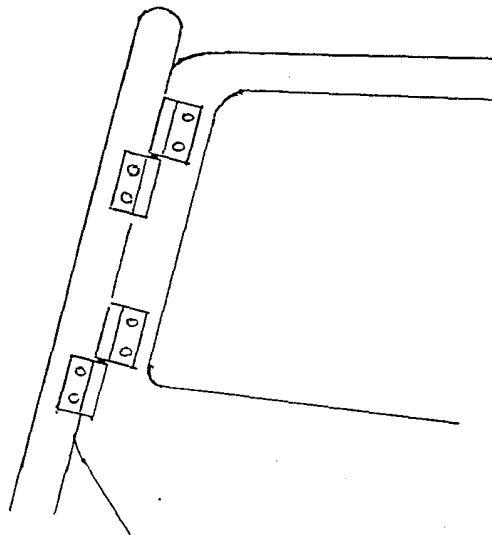
4.2 With the hood erected and tensioned, offer up the sidescreens into position. The top of the sidescreen should align with the hood guttering and the front tucks in behind the windscreen support to provide protection from the elements.

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.

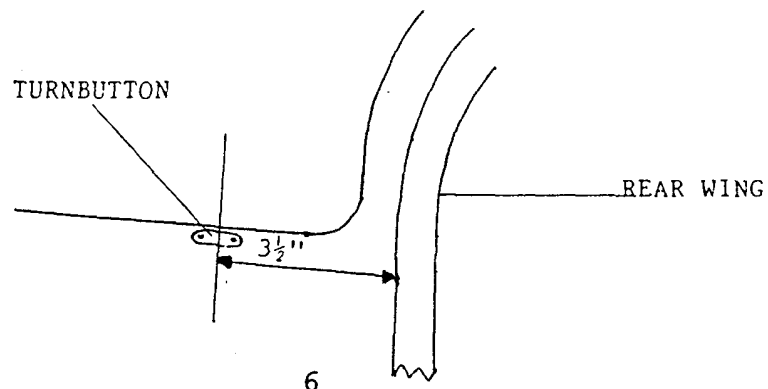
ATTACHMENT OF WEATHER EQUIPMENT KIT

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 and the addition of a sleeve fastened with Velcro to hold the hood to the top hoodstick (see Fig 13.4.6).

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) Erect the hoodsticks.
- iii) Slacken the Hoodstraps by easing them around the sides of the rearmost hoodstick reducing the normal hood height.
- iv) Unfold the Hood and clip it onto the windscreen first.
- v) 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.
- vi) Attach to the remaining poppers on the sides of the vehicle.
- vii) From the inside of the car ease the Hoodstraps round to the top of the rear Hoodstick to tension the Hood using the adjusting buckle to align the hoodsticks with the darts in the hood (13.5.1).
- viii) 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.
- ix) 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)

HIGH VISIBILITY HOOD AND SIDESCREENS

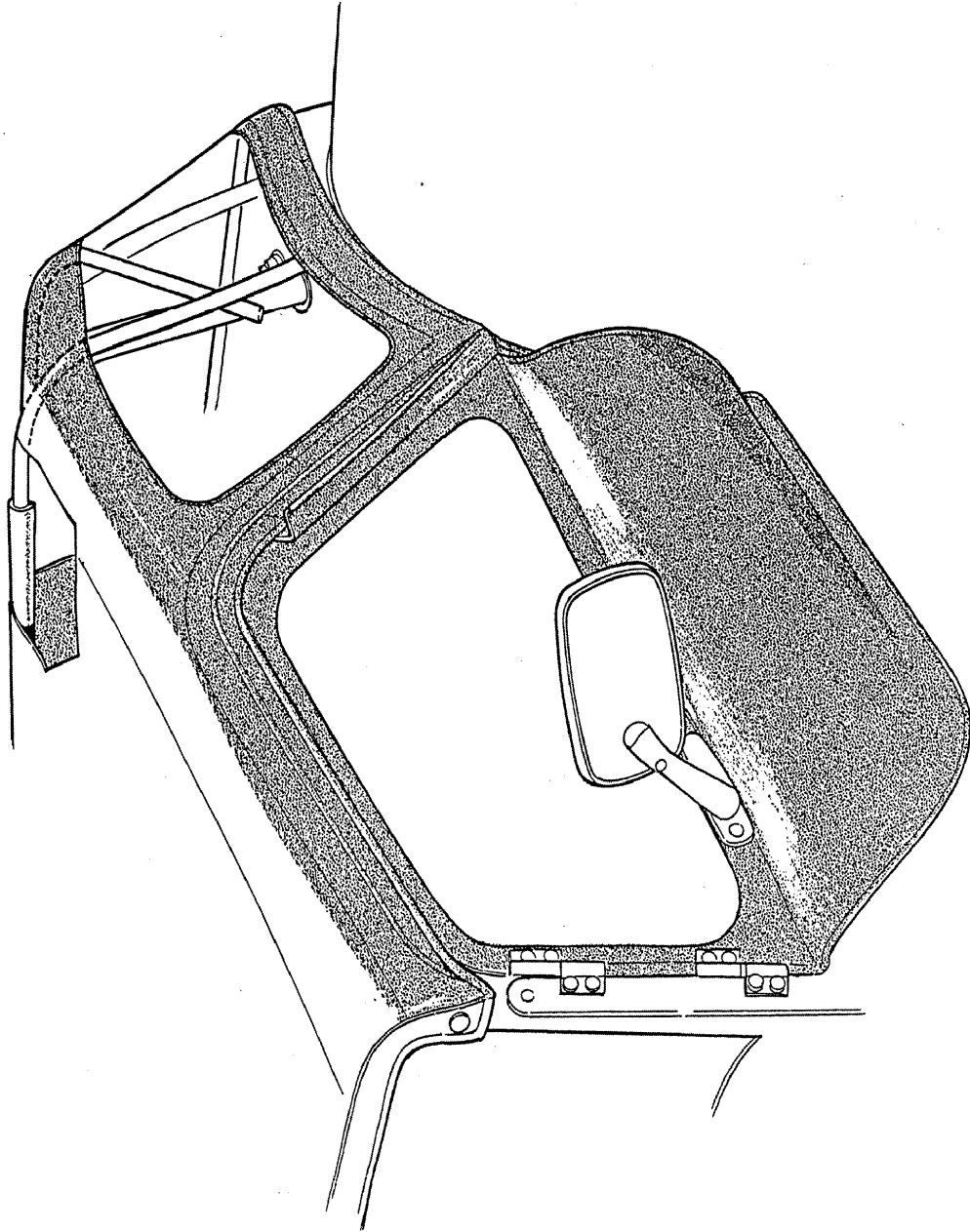
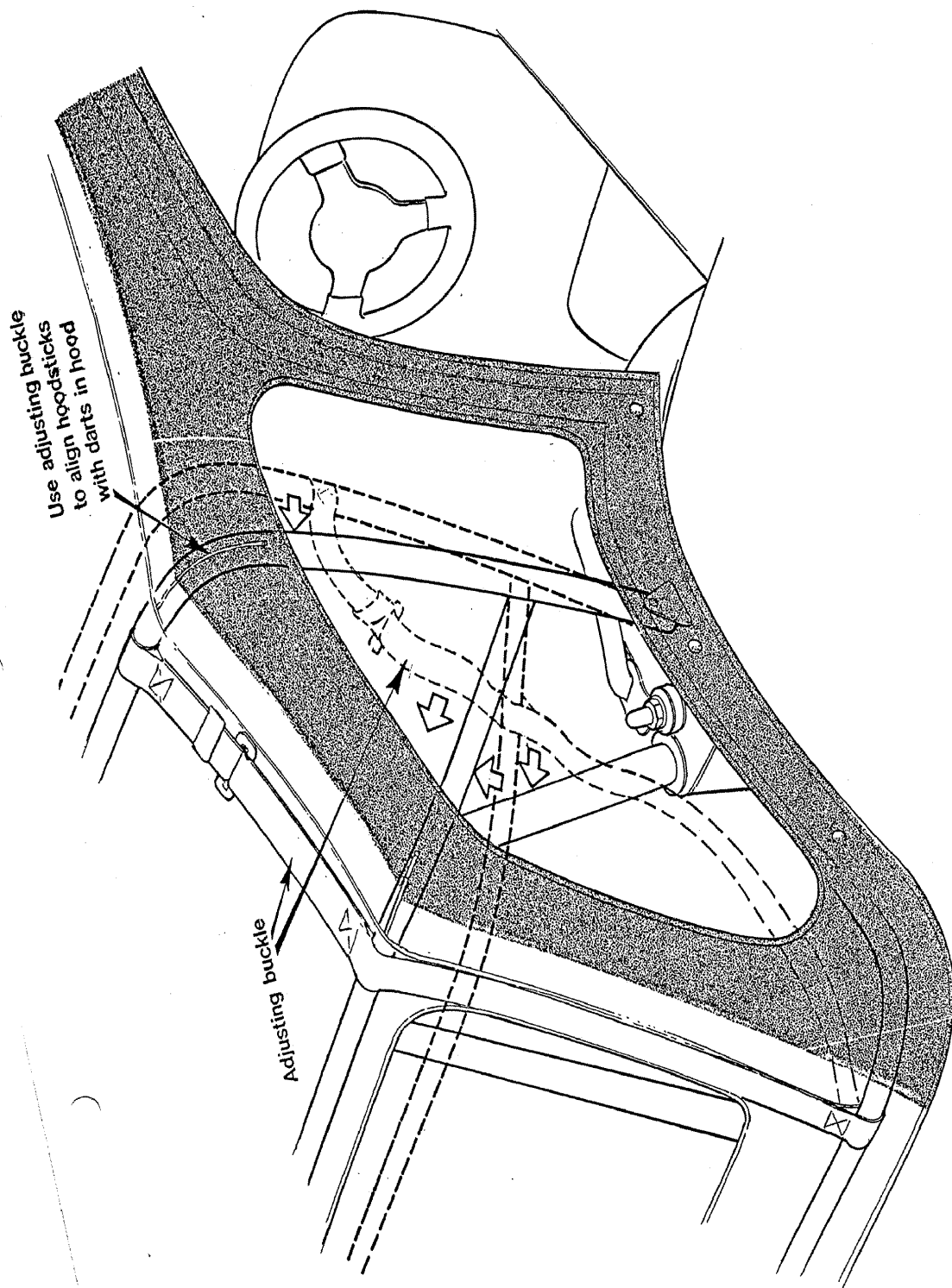


Fig. 13.4.6



TENSIONING OF HOOD

Fig. 13.5.1

Hood Folding

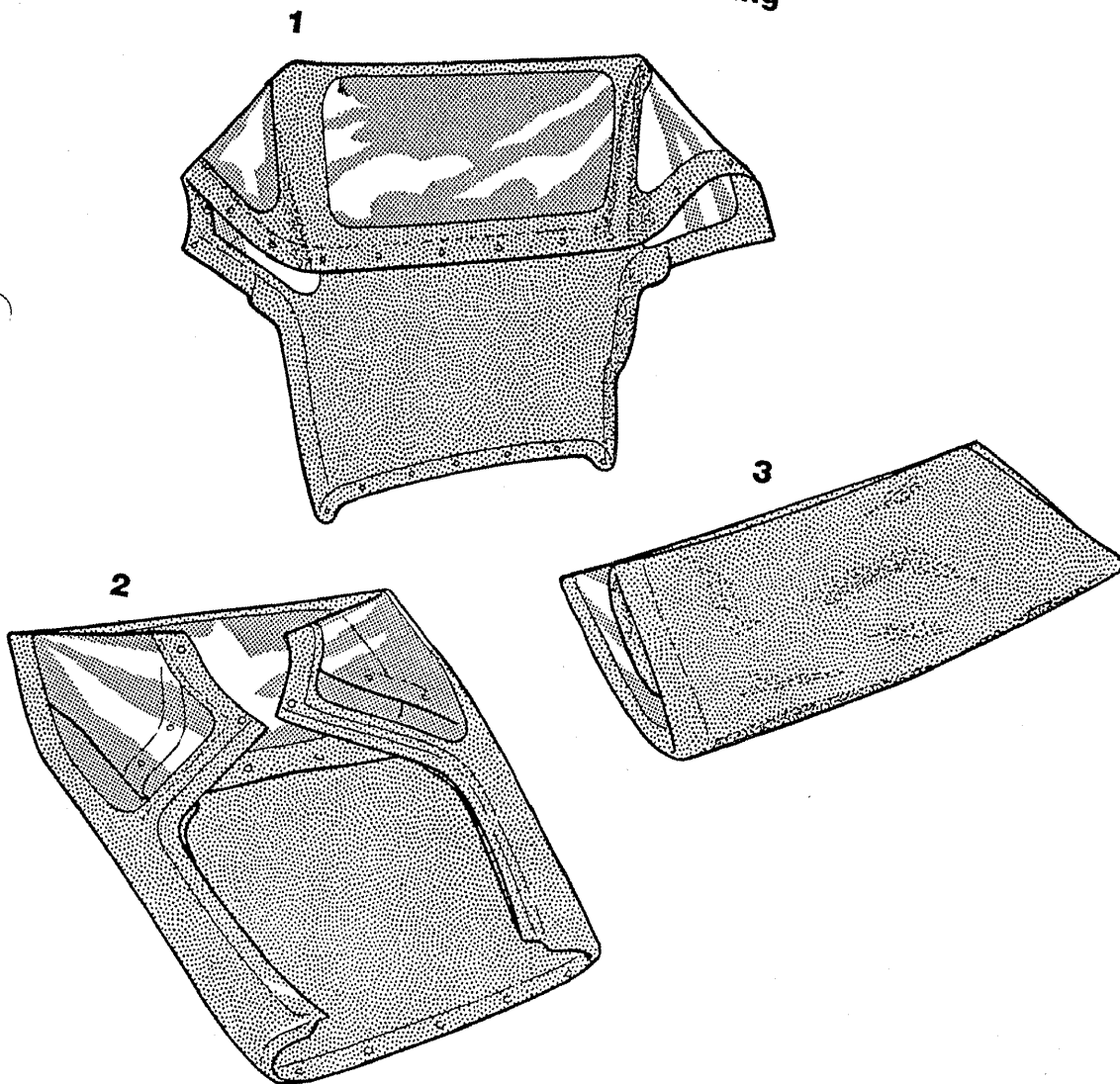


Fig. 13.5.2

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 14.1A, 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.

14.1A. Heater Control Valve

1A.1 For those wishing to obtain better control over their heaters a control valve is available which is used to cut off or reduce the supply of hot water to the heater. This kit is

OPTIONAL EXTRAS

available under Caterham part No.HV01 and consists of the valve, its operating cable and the necessary fixings. (see Fig.14.1A)

1A.2 The valve locates in the heater input hose which is the right hand one as viewed from the driver's seat. It is therefore necessary to remove a section of this hose 5cm long in line with the forward edge of the pedal box.

Place a jubilee clip over each end of the hose and insert the control valve, operating lever uppermost, and secure the clips.

1A.3 The operating control locates under the scuttle above the driver's right knee, and a hole 1/2" (12.5mm) diameter must be drilled in the vertical face of the scuttle at the bottom right hand side, taking care that this is positioned to avoid any obstructions.

Feed the cable through from inside the car and secure the cable outer to the scuttle using the nut and shakeproof washer threaded onto it, the washer on the engine bay side and use the spring clip to attach it to the control valve body.

1A.4 With the control handle pushed fully home and the lever on the valve in the shut (left viewed from the driving seat) position, the inner cable is passed through the hole in the lever and bent back on itself so that the lever can be pushed shut or pulled open.

1A.5 Finally the cable is secured to the outside face of

OPTIONAL EXTRAS

the pedal box using the 2 'P' clips provided and we suggest that these are fitted in place of the existing clips holding the brake pipe.

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 (Ford Engines Only)

4.1 The oil cooler plumbing connects to the engine using a special adaptor fitted to the oil filter housing. First remove

OPTIONAL EXTRAS

the filter and then fit the aluminium casting containing the oil cooler connections into its place securing with the special 1" sleeve nut provided. Ensure that the rubber seal between this and the oil filter housing is lightly greased to both help tightening and prevent leaks and that the nut is not overtightened since to do so will damage the oil pump/filter housing.

IMPORTANT: De Dion cars must have a Capri type oil pump fitted or the filter will foul the diagonal chassis tubes at the front of the engine bay.

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 The oil cooler is located 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 suspended above them. (see Fig 14.4A and 14.4B)

4.3 There are two oil pipes provided in the kit, the ends which attach to the oil pump/filter housing using 90⁰ unions, while at the oil cooler the right hand union is straight and the left hand uses a 90⁰ union. This allows the pipes to be fitted parallel to each other and for tidyness they can be secured

OPTIONAL EXTRAS

together with tywraps.

The oil pipes should be routed upwards from the cooler, over the radiator 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 COMPETITION 4 INTO 1 EXHAUST-SYSTEM

The Competition type stainless steel exhaust system is available for all engine variants including Ford, Cosworth BDR, Vauxhall and Rover power plants. 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 left-hand rear wheel.

You should be aware that this system is considerably louder than the standard system described in 10.8 but releases more power. However, it does not meet RACMSA silencing restrictions when fitted to certain engine variants so check with the factory first if competition is envisaged.

5.1 On chassis designed for Ford engines, 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 this 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. This work will have been completed at the factory on Vauxhall and Rover powered cars.

We also suggest that you cover the area around it with masking

OPTIONAL EXTRAS

tape which serves the dual role of protecting the paintwork if appropriate and enabling you to mark clearly where cutting is necessary.

5.2 The aperture is enlarged as follows:

i) Fit the dual pipe serving cylinders 2 and 3 onto the engine (Rover and Ford engines - BDR and Vauxhall use individual primary pipes) and temporarily secure with 5/16" UNC Allen bolts and springwashers (Ford), or to studs securing with appropriate nuts. 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.

5.3 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.

OPTIONAL EXTRAS

5.4 The silencer mounting bracket and rubber bobbin attaches in the same way as with the standard system (10.8.4). 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.

5.5 Finally attach the exhaust guard using long Jubilee clips in the same way as with the standard system (10.8.8).

14.6 Air Horn

6.1 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.

6.2 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).

6.3 Terminals should then be fitted to the two wires and

OPTIONAL EXTRAS

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.

14.7 Electronic Ignition (Ford Engines Only)

7.1 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 rotor for distributor).

7.2 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.

7.3 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

OPTIONAL EXTRAS

the right hand upper engine bay diagonal.

14.8 Boot Cover

8.1 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. Please note that it is designed to fit over the hoodsticks therefore it is essential that these have been fitted prior to the boot cover. When not in use, i.e. when the hood is erected, it folds away into the boot area.

8.2 The cover is designed to fit around the optional rollover bar, but since these vary according to chassis type, be sure to order the correct cover. There is also a special cover designed for De Dion cars fitted with the competition Rollover bar. Due to the positioning of this competition bar, it will be necessary to remove it before the boot cover can be fitted.

8.3 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.

Carefully mark out and drill corresponding holes through the front edge of the boot cover aligning the front edge with the front edge of the bulkhead, and secure it using six popper bases with the small self-tapping screws provided.

OPTIONAL EXTRAS

8.4 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.

8.5 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.

14.9 Tonneau Cover

Tonneau fitting varies slightly according to whether the chassis is fitted with a De Dion or live Axle since a different form of top spring/damper mounting is employed.

De Dion cars

9.1 Before the tonneau can be fitted both the boot cover and seat belts must be installed and it will be necessary to remove the windscreen. This is held in place by four 8mm plated

OPTIONAL EXTRAS

domehead bolts washers and nylocs which hold the screen stanchions to the scuttle sides and you should not forget to disconnect the wiring for the heated windscreen (if fitted), there is one bullet connector at each end behind the dashboard.

Remove the steering wheel and head restraints (if specified).

9.2 Establish the centre line across the top of the scuttle, (the screen washer nozzle helps here) and mark two points each $1\frac{1}{4}$ " outboard of this line. Check under the dashboard as to where the main tube supporting the scuttle is located and drill two $\frac{1}{8}$ " 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". Fit two popper bases with self tapping screws.

9.3 Carefully align the tonneau along the centre line of the car and stretch it across so that there should be about 1" of tonneau ahead of the popper centres. Mark and fit two poppers at the front to correspond with the bases just fitted.

9.4 Carefully measure the positioning of the rear edge of the tonneau relative to the popper bases securing the front of the boot cover ensuring that its rear edge is exactly parallel to the seat bulkhead and that it is properly centred.

Mark the positions of the popper bases and fit the six poppers across the back. It is very important to locate these poppers

OPTIONAL EXTRAS

correctly as these set the correct tension for the whole cover. It should not be so tight that it puts too much stress on the fittings, bearing in mind that it will not stretch as well in cold weather, nor so loose that water can collect on it.

9.5 Working one side at a time, starting with the passenger side, mark and drill a hole and fit a further popper base 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 taking care to pull the tonneau far enough forward to achieve a little clearance in front of the rear wing and fit another fastener.

9.6 Carefully pull the rear edge of the tonneau over the side of the car and mark and fit a fastener to secure it to the boot cover side.

9.7 Mark, drill and fit a popper base 0.75" 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 a fastener.

9.8 Carefully pull the rear edge of the tonneau over the side of the car and mark and fit a fastener to secure it to the boot cover side.

9.9 Mark, drill and fit a popper base at a point 2" down from the top rear of the doorway and $1\frac{3}{4}$ " forward of the rear

OPTIONAL EXTRAS

mudguards. Pull down the tonneau to achieve an even fit to the wheelarch and fit the final fastener.

9.10 Un-zip the tonneau and refit the steering wheel when fitting the first fastener leaving the rear fasteners in place along the seat bulkhead. Repeat the fitting procedure taking care to stretch the tonneau away from the vehicle centreline towards the windscreen stanchion just sufficient to prevent bagginess in front of the steering wheel.

Fastening the zip will correctly tension the tonneau.

Live Axle Cars Short and Long Cockpit

9.11 Tonneau fitting is generally similar to the above instructions except that the rear shock absorber spindles protrude above the bulkhead and eyelets are fitted to the tonneau which fit over them. This means that the location of the rear of the cover is accurately fixed and therefore saves the careful measuring required in 9.2. Fit the rear fasteners according to the logical location given by the spindles but otherwise follow the instructions in the same way as with De Dion cars.

9.12 Sidescreen Turnbutton Apertures

Tonneau covers are supplied with these holes, through which the turnbuttons which secure the sidescreens pass, uncut. This is because the optional high visibility sidescreens dispense with this form of fixing. If normal pattern sidescreens are fitted it will be necessary to cut appropriate holes in the welded

OPTIONAL EXTRAS

sections with a sharp knife or scissors.

14.10 Wind Deflectors

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

10.2 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.

14.11 Side Sill Protectors

11.1 These consist of pre-formed stainless steel plates which fit over the upper edge of the cockpit sills to protect paintwork from being damaged while entering or leaving the car.

11.2 To fit these accessories, first drill out the rivets holding the inner trim panels to the upper chassis tube along the bottom edge of the cockpit so that the longer edge of the "U" shaped protectors can be slotted down between the tube and the trim.

11.3 Having aligned the protectors and ensuring that they are flush with the top of the tubes, drill through the existing

OPTIONAL EXTRAS

holes in the trim into the protectors and rivet both trim and protectors into place.

14.12 Adjustable Platform Shock Absorbers Live Axle Only

12.1 For owners wishing to use their cars for competition purposes, the specification of this option enables the front and rear ride height to be adjusted in order to cater for springs of varying length and to be able to run their cars lower than standard.

12.2 These units are adjusted using the lower spring platforms which are threaded onto the damper body. The platform is comprised of two rings the upper of which bears on the spring and the lower is used to lock the upper one in position.

In order to adjust these special 'C' spanners should be used although it is possible to use a pair of screwdrivers there is a risk of damaging the notches in the rings designed to accept 'C' spanners.

12.3 These units are supplied from Caterham Cars with springs fitted but it will be necessary to adjust them to obtain the correct ride height as follows:

Adjust the front until the lower wishbones are horizontal which will mean that the top links of the front suspension will slope slightly downwards and inwards. As a secondary check measure the dimensions as shown on Fig. 14.12.

Adjust the rear until, without driver or passenger, the

OPTIONAL EXTRAS

dimension 'B' on the diagram is approximately 15mm higher than 'A'.

12.4 In order to achieve an even ride height from side to side you can either measure the distances from the bottom of the dampers to the underside of the locking rings or count the number of threads exposed.

12.5 It is recommended that in order to prevent the exposed threads becoming corroded or blocked with road dirt they are firstly greased and then covered with protective tape.

12.6 We also strongly recommend that you do not lower the car relative to these settings as handling will deteriorate due to substantial use of the bump stops which prevent the car's suspension from operating properly, the available wheel travel is by the very nature of the vehicle limited.

In addition, by running the car excessively low, the car's ground clearance is reduced which is likely to lead to damage to the engine sump.

If for competition purposes you still wish to reduce the ride height we suggest that you use stiffer springs to keep the car off the bump stops and fit a Dry Sump oil system to the engine in order to increase ground clearance.

14.13 Battery Master Switch

13.1 A master switch kit has been produced by Caterham cars to enable the fitment of an Autolec battery master switch,

OPTIONAL EXTRAS

primarily for competition purposes, but also for security.

This contains the following components:

- 1 Autolec Battery Master Switch with fixing bolts
- 1 Main Cable (red) Starter Solenoid to Master Switch
- 5 Female Lucar connectors and insulating covers
- 1 Male Lucar connector
- 3 Ring terminals (2 x 1/2", 1 x 5mm)
- 1 Protection "Eyebrow" and fixing bolts

All necessary cables and sufficient cable ties

Please refer to the wiring diagram Fig. 14.13. with this kit.

13.2 We recommend fitting the switch in the triangular section of the right hand windscreen stanchion and a scale template is included on Fig. 14.13.. Trace or cut out this template and use it to mark and drill three holes in the aluminium.

13.3 Remove the rubber cap from the switch and insert it from the inside of the scuttle securing with the bolts supplied. The rubber cap can be replaced on the switch but leave the key out for the time being.

13.4 Remove the existing battery to starter solenoid cable (red) completely though it is reused later.

13.5 Disconnect the two brown wires from the positive terminal of the battery, cut off their terminals and join the bare wires together. Solder to this joint the additional brown wire provided insulating well with insulating tape, and attach the 1/2" ring terminal to the other end.

OPTIONAL EXTRAS

This new wire is routed along the chassis tube above the gearbox, up through the wiring loom grommet in the transmission tunnel cover and then behind the dashboard to the switch, connecting it to either of the main terminals.

13.6 Attach the new red main battery cable to the starter solenoid and following the chassis members, run this above the gearbox, through the wiring grommet and along to the switch attaching it to the same terminal as the brown wire.

Ford Engined Variants

13.7 Unclip the black plastic cover from the rear of the steering lock, protecting the ignition switch terminals, and remove the terminal with the two white wires attached to it.

Using the male Lucar connector, connect this to one of the white wires contained in the kit and having attached a female Lucar connector and an insulator to the other end of the wire, connect it in turn to one of the 'Z' terminals on the back of the master switch.

Attach a female Lucar connector and insulator to each end of the second white wire and connect this between the remaining 'Z' terminal and the ignition switch where the twin white wires were disconnected.

Rover K Series Cars

13.8 Disconnect the purple power lead in the main loom from the brown lead in the engine loom. Extend and connect the purple lead to one side of the terminal Z on the battery master switch.

OPTIONAL EXTRAS

Extend and connect the brown wire to the other terminal Z on the battery master switch, see Figure 14.13.

13.9 Solder each of the black wires supplied to each end of the resistor contained in the Autolec kit and insulate with tape. Attach an insulated Lucar connector to one wire and the 5mm ring terminal to the other.

Connect the Lucar end to the 'W' terminal on the master switch and earth the ring terminal to metal at a convenient point.

13.10 Fit the green wire with suitable connectors and attach it between the remaining 'W' terminal on the master switch and the main terminal to which the brown and red wires have been attached.

13.11 Finally the original red battery cable removed earlier should be routed from the remaining terminal on the master switch, through the grommet, and along the chassis tube to the positive terminal on the battery. CAUTION do not connect to the battery until the cable is routed and connected to the master switch.

13.12 Tie all cables to the existing loom using the cable ties provided and take care to ensure that all connections are well insulated and no wires are hanging loose.

13.13 To test the system turn the master switch to the on position and check that the lights work. Start the engine and while the engine is running turn the master switch to off, the engine should immediately die. If there is a fault recheck your

OPTIONAL EXTRAS

wiring and if this cannot be traced contact Caterham Cars.

Please note that on no account should you reconnect the battery or run the engine until the switch wiring is complete or damage can be done to the alternator.

On K Series cars it is not advisable to switch the engine off on the master switch except in emergencies as this will wipe the memory of the ECU. While no permanent damage will be done, it will result in initial rough running until the ECU has been able to re-programme itself.

13.14 Where the cut off switch has been fitted for racing purposes it will also be necessary to fit the "eyebrow" shield around it to prevent the switch being damaged in a side on accident. This is fitted to the windscreen stanchion by substituting the existing plated caphead bolts for the longer bolts supplied with the kit.

14.14 Wiper Delay unit

14.1 The wiper delay unit provides a fixed speed intermittent wipe facility activated by the existing windscreen wiper switch. The wiring loom contains a five way plug and socket located under the dashboard approximately behind the fuel gauge. Pull this apart and connect the male and female sections to the sockets on the unit. These sockets can only be connected one way therefore it cannot be incorrectly wired.

14.2 The delay unit itself should be screwed onto the back of the front bulkhead concealed under the dashboard using two self

OPTIONAL EXTRAS

tapping screws.

14.3 The intermittent wipe facility is operated as follows:

To switch on: Flick the wiper switch on and then off again briefly.

To switch off: Flick the wiper switch on and then off again briefly once again.

14.15 Flush Fuel Filler Cap

15.1 For competition purposes it is mandatory for racing and advisable for other forms of sport to fit a flush fuel filler which will not be torn off in the event of a rear end impact. Accordingly a kit is provided which consists of a new filler neck and retaining bezel, a plastic locking cap and the necessary fastenings. If you have fitted the standard filler cap already it should be removed along with the back panel grommet and the rubber hose.

15.2 Using the two self tapping screws provided attach the retaining bezel to the filler neck, noting that one of the six rivet holes in this collar should be at the top.

15.3 Cut down the original filler hose by removing a section from either end measuring 3" on the inside by 3.5" on the outside. If in doubt test fit the hose in place removing smaller amounts until it fits correctly as in 15.4 below.

15.4 Push the shortened hose onto the back of the filler neck and loosely assemble onto the petrol tank. Insert the filler cap through the hole in the back panel and capture the filler

OPTIONAL EXTRAS

neck assembly by turning the key in the lock.

15.5 Using the holes in the bezel as a guide, mark and drill six 1/8" holes in the back panel for the retaining rivets and secure passing the rivets through from the outside.

15.6 The circlips retaining the filler hose can now be tightened, and any fire protecting cover replaced. Note that although the cap as supplied is vented, it may be necessary to drill an extra 1mm hole through the cap if symptoms of fuel starvation are suffered.

14.16 Fuel Tank Protection Kit

16.1 This kit is again needed for competition purposes and contains seven pieces of 1/2" aluminium honeycomb shaped to fit around the fuel tank. Firstly it will be necessary to remove the roll over bar, boot floor and the tank itself.

16.2 Referring to Fig. 14.16 the first panel to be fitted is the centre rear panel which is secured using a thin smear of silicon sealant to the inside face of the back panel.

16.3 Remove the self adhesive foam strips from the angle brackets which support the tank and drill five 5/32" holes evenly spaced in each. Drill corresponding holes in the tank undertray noting that the crushed edge faces backwards and rivet this into place. Fit new pieces of self adhesive foam and replace and resecure the fuel tank.

16.4 Attach the two rear side plates and both end plates

OPTIONAL EXTRAS

directly to the fuel tank using silicon sealer, pressing firmly into place.

16.5 Finally replace the wooden boot board with the honeycomb one provided (rear only for De Dion), securing with self tapping screws in the same way. It may be necessary to trim this slightly in order to obtain a good fit. The roll over bar and fuel tank filler can now be replaced.

14.17 Floor Impact Protection Panels

To provide additional protection for the driver (RHD cars only) 1/2" honeycomb panels are available for all chassis types which fit onto the cockpit floor. These are secured using a thin bead of silicon sealant close to the edge of the underside of each panel, and a heavy weight should be used to hold them in place until the sealant has dried. These panels may need to be trimmed using tin-snips or a file to obtain a tight fit.

Both this kit and the fuel tank kit in 14.16 are fitted using silicon sealant. This is available along with a suitable frame applicator from Caterham Cars under part numbers 76828 and 76829 respectively.

14.18 Competition Rollover Bar De Dion

18.1 Before fitting the rollover bar it will first be necessary to remove the rear spring damper units in order to gain access to the lower mounting points. (See Section 7.4.3)

18.2 The rollover bar is slotted into the recesses provided in

OPTIONAL EXTRAS

the bulkhead behind the cockpit, and is secured from underneath by 5/16" x 1" bolts and lockwashers into the threaded holes provided in each vertical member of the bar. Leave these bolts loose for the time being so that the bar can be moved to allow alignment of its other fixings.

18.3 The rear diagonals are secured to the brackets provided at the rear of the boot compartment using 5/16" x 2" bolts and nylocs with a plain washer under both the boltheads and nylocs.

The main mounting flange is attached using 5/16" x 1" bolts, plain washers and lockwashers at the rear outside edge, and by the 7/16" x 1" bolts holding the full harness seatbelts at the inner edge. When all the bolts are located they can be fully tightened and the rear spring damper units replaced.

18.4 The diagonal brace is fitted between the top of the rollover bar and the inside edge of the cockpit on the passenger side (RHD cars). It is supplied in two halves so that it can be adjusted exactly to fit each individual chassis.

The forward and lower mounting is to a bush located within the chassis and normally hidden behind the trim panel. It can be found approximately one inch below the point at which the dashboard tube is welded to the top of the chassis rail.

Drill out six 3/16" rivets holding the top edge of the trim panel in place around this point and ease the panel away from the chassis until the exact location of the bush is identified. Drill a small pilot hole through the trim panel and enlarge so

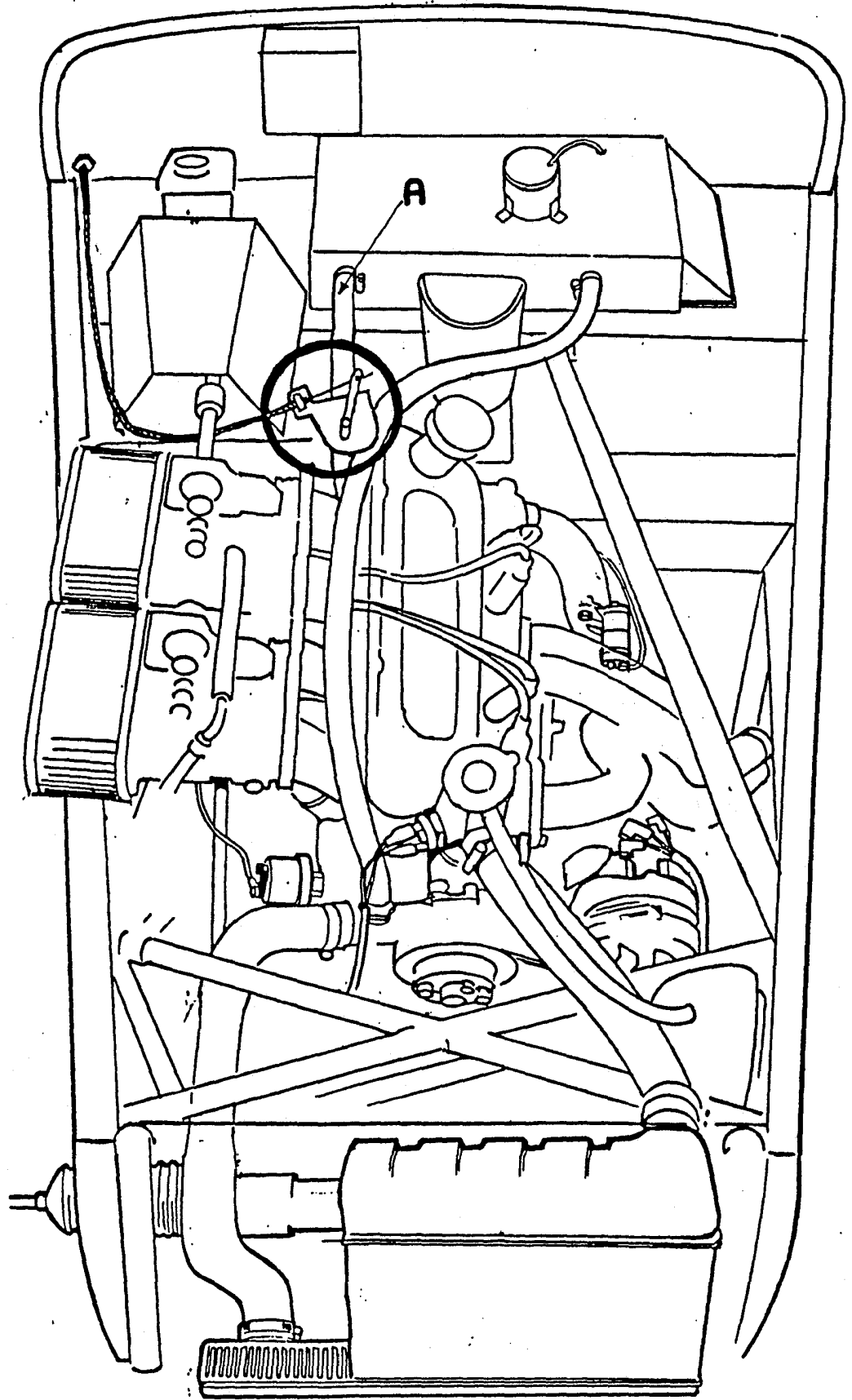
OPTIONAL EXTRAS

that a 7/16" bolt can be fitted through, taking care when doing so that the thread in the bush is undamaged. When this can be done replace the trim using new dome headed rivets.

The top half of the brace is secured to the top of the rollover bar with a 7/16" x 2³/₄" bolt and nyloc with plain washers under both the bolt head and nyloc, while the bottom section is secured to the bush in the side panel using another 7/16" x 2³/₄" bolt, plain washer and lock washer.

The two halves are held together by another 7/16" bolt, nyloc and washers after first drilling through both sections to suit.

18.5 We strongly recommend that all parts of the rollover bar likely to be contacted by either the driver's or passenger's heads be protected. We suggest that you obtain some foam pipe lagging of appropriate size and tape it to the bar using canvas tank tape or similiar.



UNDERBONNET ILLUSTRATION SHOWING HEATER AND CONTROL VALVE
"A" SHOWS HEATER INPUT HOSE

Oil Cooler Pipe Layout

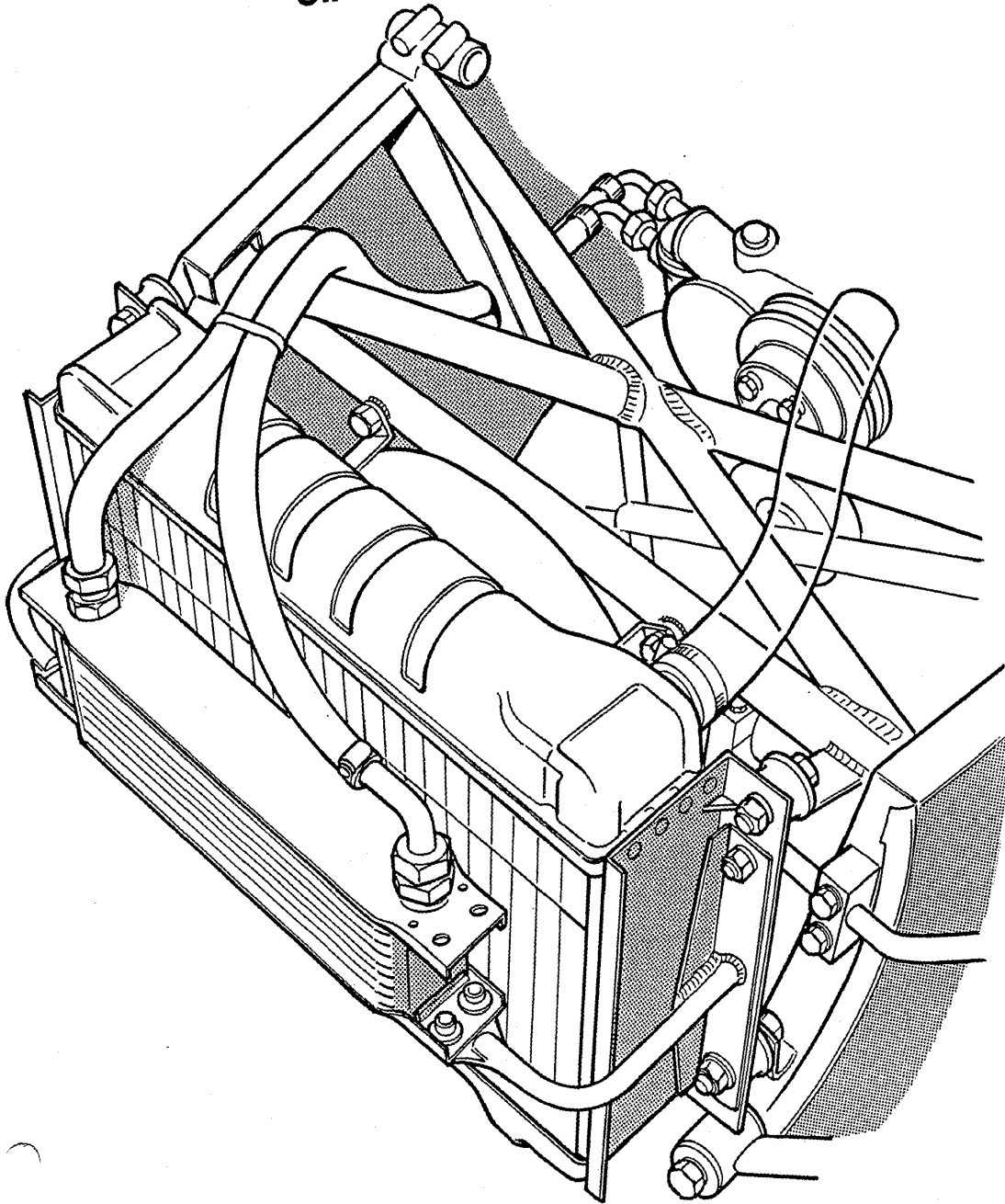


Fig. 14.4A

Rear of Radiator

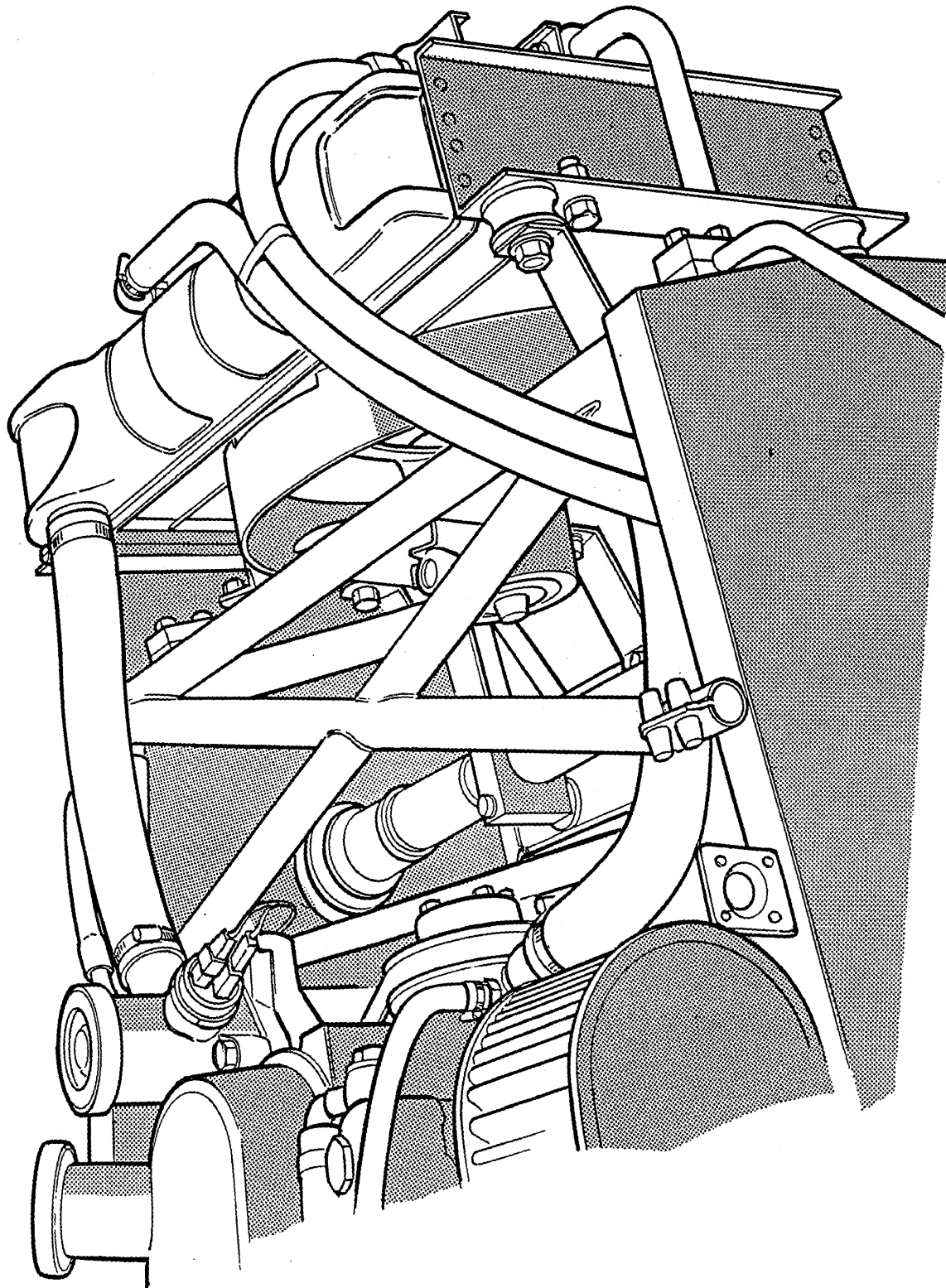
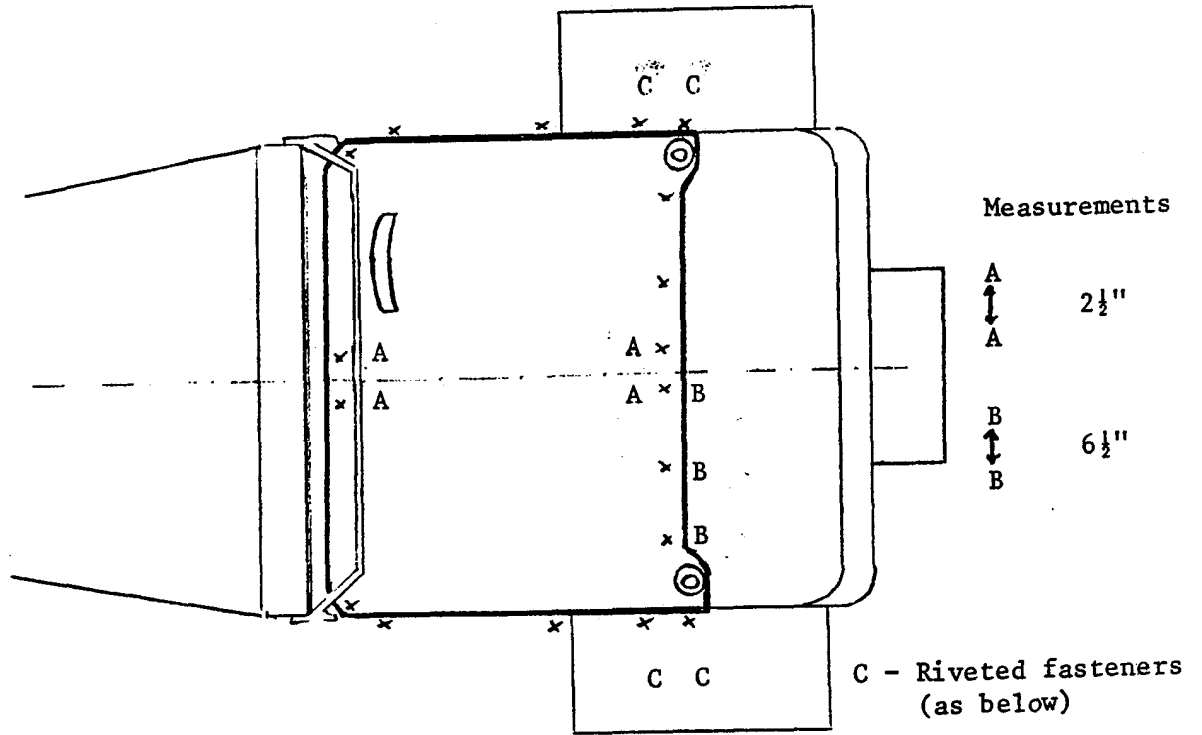
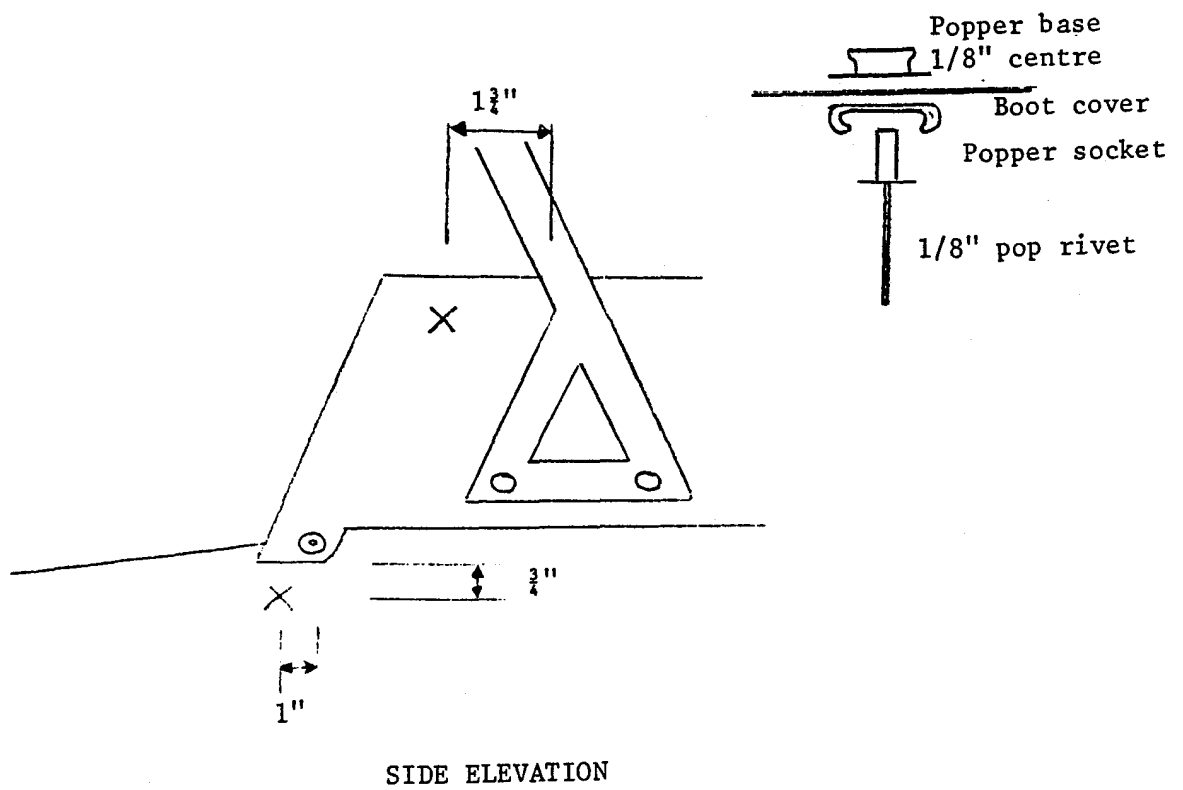


Fig. 14.4B

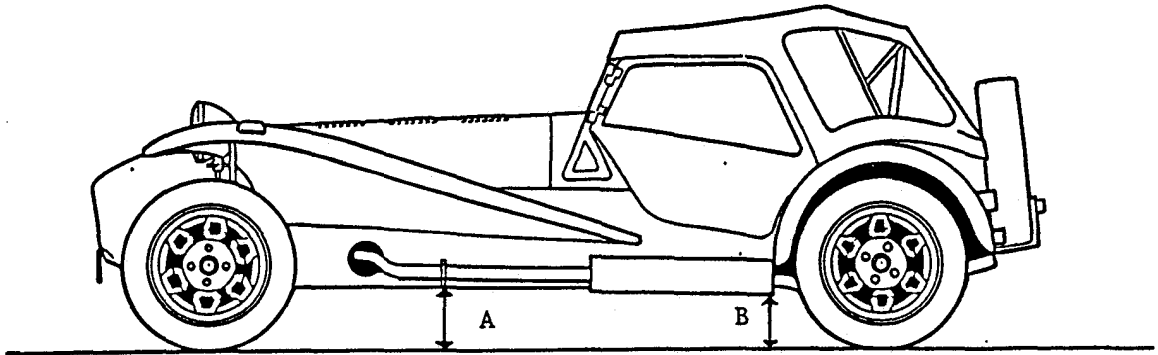
TOP ELEVATION



TONNEAU COVER SHOWING LOCATION OF FASTENERS



RIDE HEIGHT AND GEOMETRY SETTINGS



A - 140mm (MEASURED AT FORWARD EDGE OF FLOOR PAN TO THE GROUND)

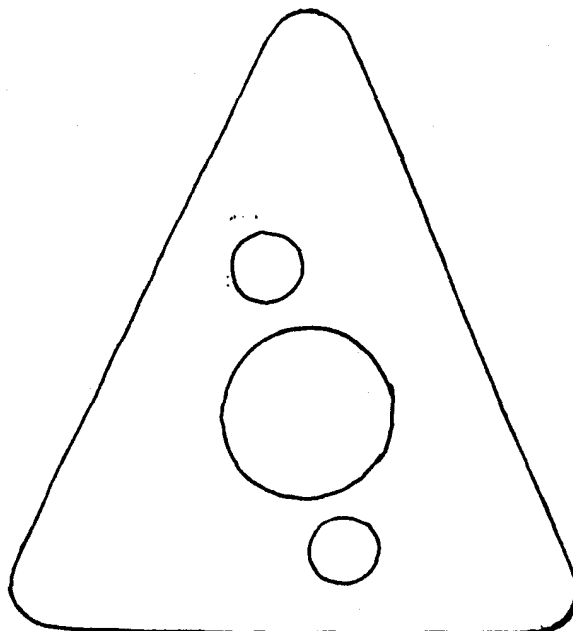
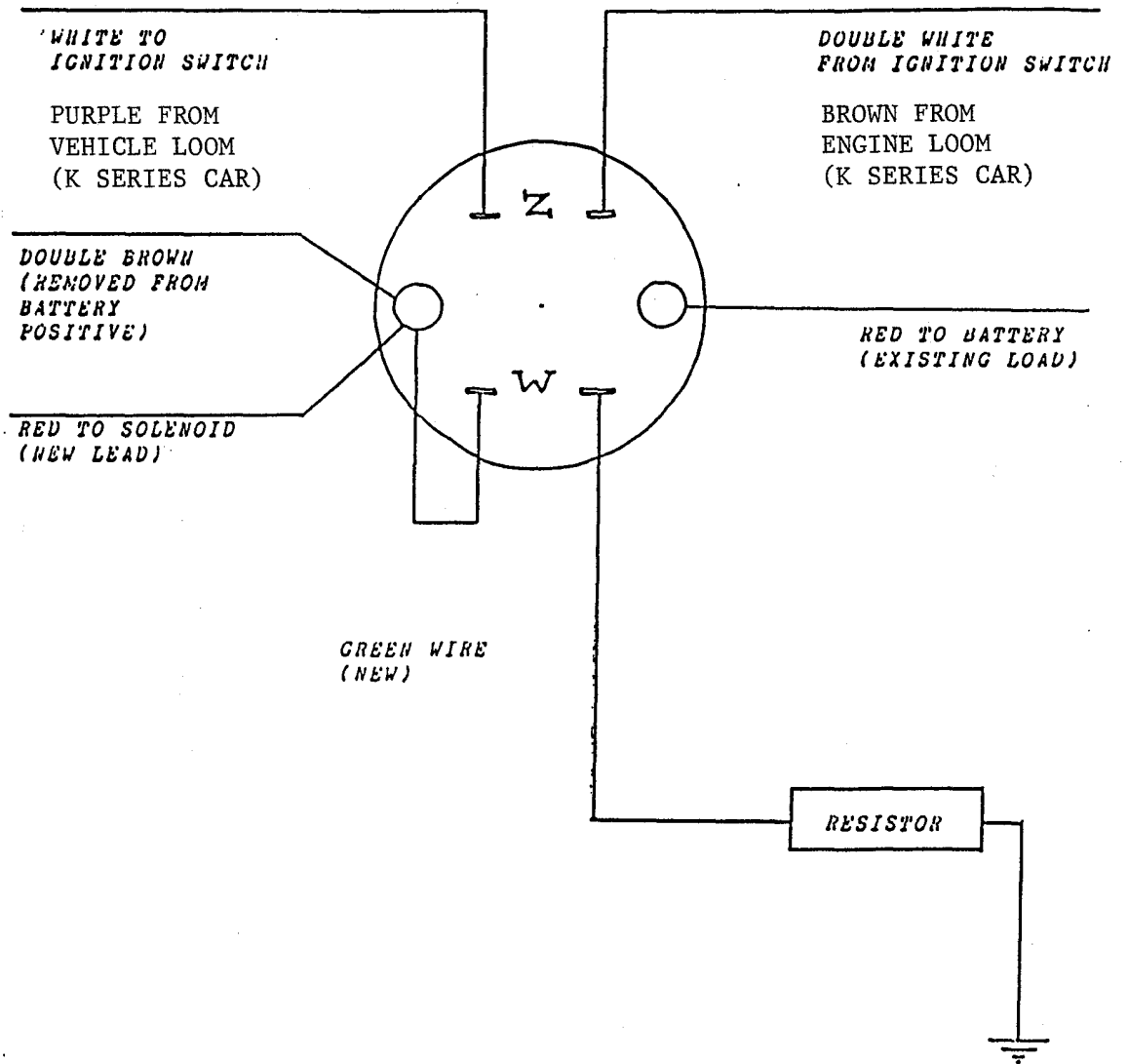
B - 155mm (MEASURED JUST IN FRONT OF THE REAR WHEEL ARCH)

THESE TO BE MEASURED WITH A TOLERANCE + OR - 10mm BUT ENSURE THAT THE REAR RIDE HEIGHT IS ALWAYS APPROXIMATELY 15mm HIGHER THAN THE FRONT.

	FRONT	REAR
TOE-IN	0.0°	0.0°
CAMBER	0.5° - 1.0° NEG	0.5° - 1.0° NEG
CASTOR	5.0° - 7.5° (OPTIMUM 6.5°)	N.A.
KING PIN INCLINATION	11.0° - 13.0°	N.A.

Fig. 14.12

BATTERY MASTER SWITCH



TEMPLATE FOR MASTER SWITCH SHOWN ACTUAL SIZE

REAR

FRONT

Fig. 14.13

Installation of honeycomb fuel tank protection kit

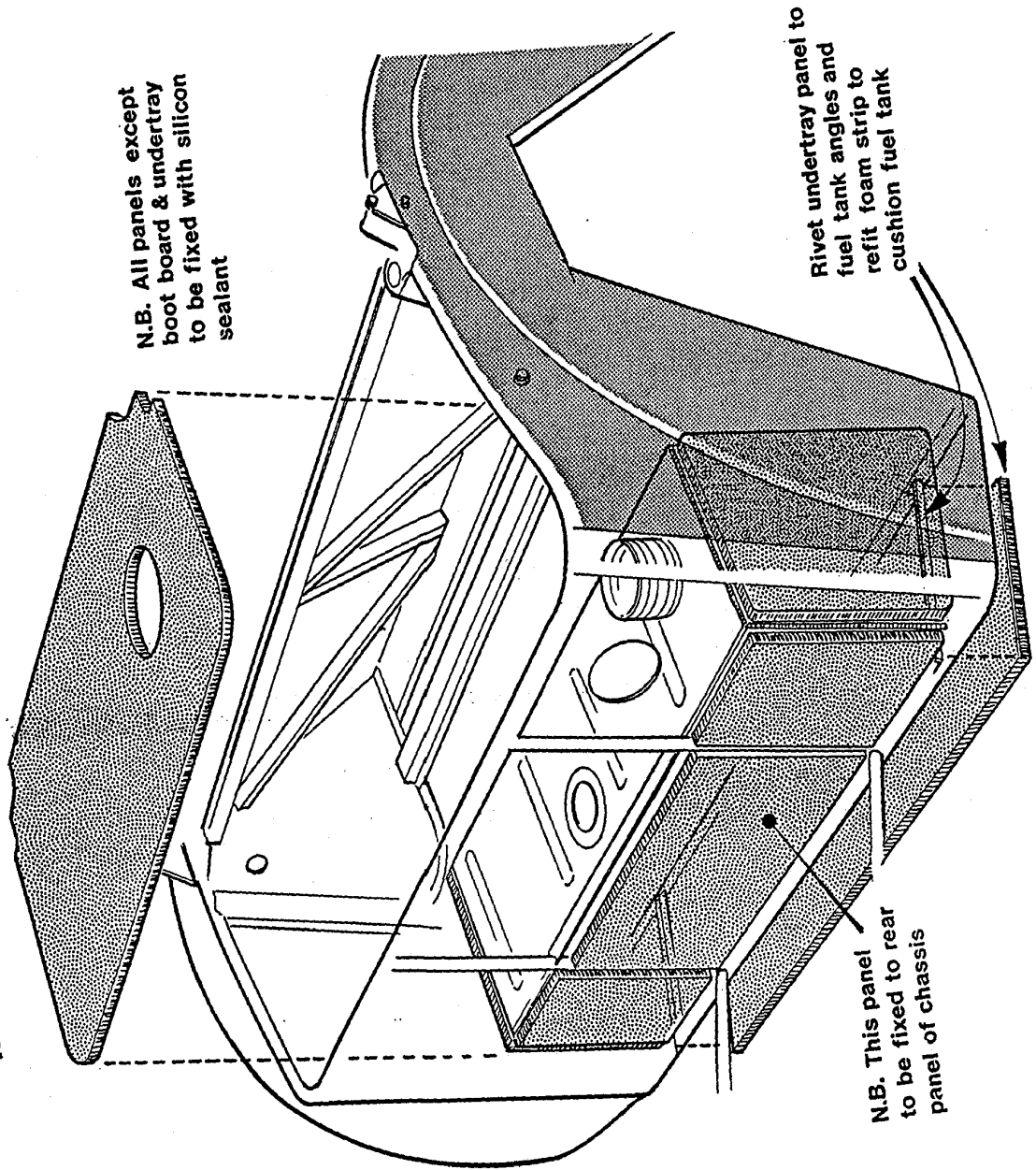


Fig. 14.16

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.

Caterham Cars have appointed the following official motor sports agent to assist customers with all aspects of race car preparation.

Magnus Laird
Hyperion Motorsport
Unit 15, Crittall Road
Witham, Essex CM8 3DR Tel: 0376 502044

- 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
- 16.5. Additional Maintenance

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, MOTORSPORTS HOUSE, RIVERSIDE PARK, COLNBROOK, SLOUGH SL3 0GH. TEL: 0753 681736

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 CARS ROADGOING series, it will be necessary to register with ENTREPRIX LTD who have been appointed by Caterham Cars as co-ordinators. Contact Belinda or Jim McDougall at 9 BEAM PADDOCK, BAMPTON, OXFORDSHIRE OX8 2BN TEL: 0993851327 and they will be happy to help you with all racing matters. You will also need 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 "Acaneada" Aston Tirrold, Didcot, Oxon OX11 9DD.

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

PREPARATION FOR COMPETITION

date. You should note that hillclimbs in particular tend to be oversubscribed, so get entries posted early in order to avoid disappointment.

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.

Under newly tightened RACMSA regulations, you must wear fireproof overalls, which should ideally be made from double layer Nomex, gloves, socks and balaclavas although boots are a matter of preference. However, it is advised to use all protective clothing available. You will not be allowed to compete without the proper clothing.

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

PREPARATION FOR COMPETITION

and insurance certificates. You should also hand in a completed commentators' information sheet. Assuming that all your 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 must carry an RACMSA sticker of approval so make certain that you buy one from a motor sports specialist.

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

PREPARATION FOR COMPETITION

seek to cover eligibility, except to say 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 ROAD GOING SERIES. Detailed regulations are available from Entreprix and entry forms from 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.

Instructions for the fitment of this bar are provided in Section 14.18.

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 Safety Devices should be consulted and subsequently any one off bar will need to be approved by Caterham to be eligible for their race series.

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 and Impact Protection

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. A suitable kit is available from Caterham to achieve this but note that the wooden floor must be retained as this provides impact protection not possible with aluminium sheet. Ideally the edges where this kit meets the existing

PREPARATION FOR COMPETITION

aluminium floor and sides should be sealed using glass fibre but, in practice, scrutineers appear happy if the gaps are carefully sealed with tank tape.

Alternatively and preferably a replacement boot floor and fuel tank protection kit is available in aluminium honeycomb from Caterham under the following part numbers:

T102	Long Cockpit
T103	1990 specification De Dion

See Section 14.16 for fitting instructions.

This can be supplemented by fitting floor impact protection panels which are available for all models under the following part numbers. You should note that with these in place it is no longer possible to fit an adjustable driver's seat.

F102	Long Cockpit
F104	1990 specification De Dion

See Section 14.17 for fitting instructions.

In addition it will also be necessary to replace the existing fuel filler with a flush fitting variety. A kit is available from Caterham Cars under Part No. FF01 at a cost of approximately £34.00 + VAT. See Section 14.15 for fitting instructions.

2.4 Fireproof Front Bulkheads

Live axle cars have a simpler specification pedal assembly which lacks the water and hence flameproof cover fitted to De Dion cars. This has given rise to scrutineering difficulties and hence a special kit allowing the fitment of an enclosed pedal

PREPARATION FOR COMPETITION

box has been made available under part number PB10. This kit is provided with its own set of detailed instructions.

If a heater kit is not fitted, it will also be necessary to seal off the apertures in the front bulhead provided for air circulation using aluminium sheet rivetted or screwed into place and sealed with silicon sealant.

2.5 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 and a protective "eyebrow" around the switch to prevent it being damaged in an impact. (see 14.13 for full fitting instructions)

2.6 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 at

PREPARATION FOR COMPETITION

present though likely to become a requirement in future. A hand held extinguisher will suffice.

2.7 Throttle Return Spring

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

To solve this problem, Caterham Cars can supply a replacement operating lever for the forward carburettor with provision for an extra throttle return spring. The additional modified hair spring is attached to a secondary hole in the tubular throttle cable bracket. (This applies to Webers using Caterham throttle linkages only)

Operating lever Part No: 77826

Return spring Part No: 77827

2.8 Oil Catch Tanks

When racing, an engine's tendency to lose oil through its

PREPARATION FOR COMPETITION

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.

2.9 Headrest

It is a requirement that a head restraint should be attached firmly to prevent the driver's head moving back in an accident. This can be achieved on De Dion cars by wrapping the foam lagging sold to protect pipes from frost around the diagonal tube behind the drivers head, and covering with tank tape.

2.10 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.

2.11 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

PREPARATION FOR COMPETITION

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 licence holders.

6.3. 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. However we can recommend that you contact SPR Engineering, one of our recommended service agents, who specialize in the preparation of Ford engines for competition. Their address is as follows:

SPR Engineering
4 Twyford Business Park
London Road
Bishops Stortford Tel: 0279 506162

4.1 Lowered and Up-rated Springs

These are available for live axle cars only 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. At present lowered and up-rated springs are not available for De Dion cars, but the standard De Dion springs are already harder than live axle competition ones.

4.2 Adjustable Platform Shock Absorbers

On live axle cars these dampers which are manufactured by Spax 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

PREPARATION FOR COMPETITION

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. (see 14.12 for further details)

It is possible to modify Spax front units to fit De Dion cars and this can be done as follows:

- i) File 0.050" from the lower mounting bushes
- ii) Slacken the nut holding the lower wishbone to the front upright to within 2 threads of coming apart, in order to allow for the greater length of the Spax compared with the Bilstein dampers.

Equivalent units for De Dion cars are not available, though the special units developed for the Vauxhall powered race series will fit, they are differently rated and require different springs. Refer to Caterham Cars for details.

4.3 Axle Baffling Live Axle Only

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.

4.4 Competition Driving Seat

The standard seats are not ideally suited to racing as they

PREPARATION FOR COMPETITION

neither allow for 6 point harnesses nor for additional underfloor honeycomb protection and, with taller drivers, allow the drivers head to be insufficiently below the top of the roll-over bar.

Caterham Cars have looked into this problem, but due to the wide disparity in the shapes and sizes of different drivers are not able to source a suitable universal racing seat. Nevertheless, having had special seats made up for our own development personnel, the expertise to manufacture bespoke seats is available from Oxted Trimming. We suggest therefore that you contact Wil Mariner directly if you need a seat made on Oxted (0883) 712112, but unfortunately such a one off seat is likely to cost £300-400 + VAT.

As a cheaper alternative, Hyperion Motorsport have developed a range of glass fibre buckets, though these are intended for racing only and provide support rather than comfort.

4.5 Dry Sump Oil System

For serious competition use, particularly where it is intended to use slick racing tyres, a dry sump kit for Ford engines is available under part number DSO2 which contains all the parts needed to convert a Ford Kent 2265E overhead valve engine or Cosworth BDR or BDA for installation in a Seven. This is a specialist job however so we recommend that you seek advice from your engine builder or Caterham Cars.

4.6 adjustable Camber/Castor De Dion Only

1991 specification De Dion cars incorporate the facility to

PREPARATION FOR COMPETITION

adjust both camber and castor in order to fine tune the car's handling for competition purposes. Generally increased negative camber will improve the car's high speed stability and turn in, though settings are quite critical and depend upon such factors as tyre size and type. We recommend seeking advice from Caterham or Hyperion Motorsport before changing the standard settings, and you should be aware that camber and castor changes will also affect the tracking.

4.7 Competition Petrol Tank

A Formula 1 style bag tank as fitted to Caterham Vauxhall racing cars is available from Caterham Cars at a price of £460 + VAT. this tank is fitted with an in boot filler and maximises safety in a rear end impact.

16.5. Additional Maintenance

Vehicles used for competition purposes are subjected to stresses far in excess of those normally encountered in normal road use. It is very important that not only should the normal maintenance schedules be strictly observed but that a further thorough check be carried out before each event. This is important both from a safety point of view and to be competitive, a car that does not finish the course will not win anything!

5.1 Suggested Pre Race Check

Chassis

a) Check tyre pressures, correct wheel tightness, and tyre condition. For racing purposes it is often advisable to increase

PREPARATION FOR COMPETITION

pressures over the normal recommended road settings, though this practice is dependant on the size and type of tyre used.

b) Check brake system, including pad and shoe wear, pedal travel and fluid level. Live axled cars may need frequent adjustment.

c) Check front wheel bearings and adjust if necessary.

d) Check tightness of all suspension and steering components paying particular attention to the rear 'A' frame bushes, these do loosen under the stresses of competition.

e) Check the front wheel alignment, particularly if you have bounced hard over kerbs or suffered an off track excursion in your previous event.

f) Carry out a general check on the whole car looking for items that have worked loose or been bent or otherwise damaged. In particular check the operation of all controls.

Engine

g) Check engine oil level and top up if necessary. If the engine has blown oil into its catch tank do not re-use it, but ensure the tank is empty before presenting the car to a scrutineer. If the engine has been over filled, the chances are that the excess will be blown into the catch tank so a small amount after a race is no concern.

h) Check security of engine ancillaries and manifolds, tightening anything that may have worked loose. Do not however

PREPARATION FOR COMPETITION

risk overtightening bolts 'to be on the safe side', always use a good quality torque wrench. In particular ensure that the alternator drive belt is correctly adjusted since the engine will be sustaining higher revs than normal and the water pump will need to be operating properly to avoid overheating.

- i) Check the cooling system for leaks, topping up as necessary.
- j) Check the adjustment of both clutch and throttle cables, remembering that a stretched throttle cable may no longer be opening the carburettor chokes fully with a detrimental effect on performance.
- k) The gearbox and rear axle/differential will not normally require topping up but check underneath the car for any signs of oil leakage.

Safety

- l) Check security and adjustment of your safety harness, replacing it if there are any signs of cuts or fraying. Never re-use a seat belt if it has been stretched by any kind of impact.
- m) Check that the pressure indicator on your fire extinguisher (if fitted) shows it to be ready for action and ensure that the safety release pin is removed before the car is taken onto the track.

PREPARATION FOR COMPETITION

5.2 Accident Damage

In the event that your car sustains accident damage, hopefully an unlikely event, it is vitally important that it is properly repaired. Impact damage to any front corner of the car is likely to overstress safety critical components which are the stub axle, steering arm, upright, trunnion and top link. Wishbones should be replaced if there is any evidence of distortion, not straightened.

Although damage to these components may not be visually evident components may well have been overstressed leading to a later failure. When in doubt always replace with new parts.

If the chassis itself has been distorted, proper repair can only be carried out on the correct jig. Please contact Caterham Cars for assistance, if the chassis is repaired in any way twisted it will neither handle properly nor be safe.

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 close to 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.

New Caterham supplied alloy wheels are fitted with steel inserts enabling secure tightening of the wheel nuts. However, these inserts can tighten themselves into the wheels over the first few hundred miles causing the wheel nuts to lose torque. IT IS VERY IMPORTANT THEREFORE TO RETIGHTEN YOUR WHEEL NUTS AFTER THE FIRST 200 MILES.

Tyre pressures in p.s.i should be as follows:

	front	rear
13", 14" and 15" wheels	18 - 20	18 - 20
16" wheels	16	16

Please note that wheel/tyre combinations supplied by Caterham, and included in CKD kits, are pre-inflated to around 40 psi to ensure that the tyre is correctly seated on the wheel. Do not forget to let them down.

FINAL CHECKS AND SERVICE INFORMATION

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

Engine (Ford)	SAE 15W/40 (UK climate) or SAE 15W/50	3.3 litres
Engine (Vauxhall)	SAE 15W/40 (UK climate) or SAE 15W/50	4.5 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	SA3J 1703f DOT 4	

Caterham Cars use Shell lubricants especially Gemini Engine Oil

1.4 The spring damper units fitted to live axle cars 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 - De Dion Only

2.1 De Dion cars 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.

FINAL CHECKS AND SERVICE INFORMATION

The range of movement is limited and adjustment towards the extremes of travel will lead to the pedals lifting to a somewhat high position, but we believe that in combination with the adjustable seat, the majority of drivers will find a suitable setting. (see Fig. 17.2.)

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 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 eight 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

FINAL CHECKS AND SERVICE INFORMATION

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.

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 two provided in the chassis.

In order to level the throttle with the brake and clutch it may be necessary to move the bolt to the alternative mounting point. 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 eight fixing screws properly tightened.

17.3 Initial Carburettor Set Up and Ignition Timing

It is very important, before the engine is run for any length of time, to ensure both the ignition timing and carburettor tuning is correct. Fine tuning can be carried out by your engine tuner or by Caterham Cars or its approved agents at the post-build

FINAL CHECKS AND SERVICE INFORMATION

check, but in order to get the engine running at least satisfactorily in the absence of professional equipment, the following instructions may prove of use. The ignition setting procedure does not apply to Vauxhall engines which have electronically mapped ignitions, but the carburettor balancing instructions apply to all engines using Weber DCOE carburettors.

3.1 Ignition Setting Ford Engines Electronic Ignition

Referring to diagram 17.3.1, you will see that timing marks are provided on the crankshaft front pulley and on the engine front cover. Check that the number one cylinder is at top dead centre, i.e. the forward piston is at the top of its travel with both valves closed, and set the mark on the crankshaft pulley to the appropriately (14° for Caterham sourced engines), the marks on the front cover representing 0° , 4° , 8° , and 12° .

The engine should always be turned in its normal clockwise direction of travel in order to take up the slack in the drive gears and timing chain, so if you overshoot the mark turn the engine back at least 45° before trying again.

With the crankshaft correctly set, the distributor clamping bolt can be slackened in order that it can be turned, but not too loosely. Remove the High Tension lead from the coil and stand a short length of metal (e.g. an Allen Key, screwdriver etc) in the top of the coil such that it is within 10-15 mm of the surrounding metal.

Switch the ignition on and then turn the distributor about 20° anti clockwise, then very very slowly turn it back clockwise

FINAL CHECKS AND SERVICE INFORMATION

until the "crack" of the spark is heard or seen. Stop turning it immediately and lock the distributor at that point, the ignition should now be set with reasonable accuracy. If you overshoot the "crack" point, turn back the distributor through at least 20° and repeat the exercise.

3.2 Setting Twin Weber DCOE Carburettors

If you have an engine supplied by Caterham Cars the carburettors will have the correct jets installed but will not have been set up as this is not possible without the engine running. Before attempting this procedure which in effect is to set up the carburettors by ear, read through the instructions and study the diagram 17.3.2. carefully.

i) Identify the four idle mixture screws referring to the diagram and close them by turning clockwise until the first signs of resistance is felt. DO NOT OVER TIGHTEN OR PERMANENT DAMAGE WILL BE DONE. Open each screw through exactly $2\frac{1}{2}$ turns.

ii) In the absence of a balancing tool, the next task is to set the throttles so that the butterflies in both carburettors open simultaneously. This can be done by eye observing the movement of the butterflies against the progression holes, which are covered by brass plugs. These plugs are positioned directly outboard of each idle mixture screw and it is necessary to remove the right-hand one from the left-hand carburettor and the left-hand one from the right-hand carburettor. When removed three progression holes are revealed.

FINAL CHECKS AND SERVICE INFORMATION

iii) Looking through the 1mm hole nearest to the cylinder head on the left-hand carburettor, find the outer edge of the throttle butterfly. You may find it helpful to use a torch and to move the throttle lever by hand to show the movement of the butterfly. Turn the idle speed adjusting screw, located on the right-hand side of the left-hand carburettor, clockwise until the butterfly edge is positioned across the centre of this 1mm hole.

iv) Between the two carburettors there is a horizontal balancing screw which is used to set the throttles relative to each other. Turn this screw until the edge of the butterfly in the right-hand carburettor exactly corresponds with its neighbour. The balance is now set, and this horizontal screw must not be touched again or the procedure will need to be repeated. Replace the brass plugs, and turn the idle speed screw on the left-hand carburettor anti-clockwise until the throttle lever ceases to move any further shut, then screw it clockwise $1\frac{1}{2}$ turns.

v) Assuming that the ignition is correctly set and the car has petrol oil and water, the engine can be started and warmed up, adjusting the idle speed screw until the engine will idle at about 1000 rpm. You are now ready to reset the idle mixtures on each carburettor choke in turn.

vi) With the engine running and at normal temperature close the number one cylinder (forward) idle mixture screw 2 turns. At this point the engine will slow and run on only 3 cylinders, so

FINAL CHECKS AND SERVICE INFORMATION

open one turn and then successive quarter turns always allowing at least 5 seconds for the engine to settle on the particular mixture and for you to hear the effect. Normally, with the screw between 2 and 3 turns open the engine will speed up and run more smoothly.

vii) Repeat this process with the other three idle mixture screws, after which the engine will probably be idling at around 2000 rpm. Adjust the idle speed screw until it ticks over at about 950 rpm and repeat the whole process again to get a finer tune, setting the idle to 950 rpm again when finished. The important thing is to always allow enough time for the engine to stabilise after each adjustment.

17.4. 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
- b) Checking both braking systems for leaks or faulty assembly
- c) Checking all electrical installations and circuits

FINAL CHECKS AND SERVICE INFORMATION

- d) Checking installation and lubrication of engine gearbox and rear axle
- e) Checking body and weather equipment
- f) Road test by experienced Caterham personnel

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

Customers for all kits are sent a voucher covering a free Post Build check which can be carried out either at our premises at Crayford (please contact Mike Dixon on 0322 59125) or at the following post build check centres:

1. Road and Sportscar Components

Unit 7B	Tel 0790 53933
Vale Industrial Estate	Fax 0773 531116
Vale Road	Contact Graham Sykes
Spilsby	
Lincolnshire	

2. SPR Engineering

4 Twyford Business Park	Tel 0279 506162
London Road	Fax 0279 657789
Bishops Stortford	Contact Pippa Jacobsen
Herts CM23 3YT	

3. Exclusively Seven

38 Glenfield Road	Tel 07842 41466
Ashford	Fax 0276 51390
Middlesex	Contact James Whiting
TW15 1JL	

The inspection will take approximately 2¹/₄ hours and we suggest that you allow at least two weeks notice when booking your car in. If you need any additional work done please notify this at the time of booking so that sufficient time can be made available.

FINAL CHECKS AND SERVICE INFORMATION

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

Also at the rear of this section you will find a questionnaire on both this Assembly Guide and the accompanying video. It would be much appreciated if you let us have your comments on this as the guide is being constantly updated and improved and any areas which you may have found difficult or ambiguous can be clarified.

17.5 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.

New factory supplied Ford crossflow engines are built to run on unleaded fuel and fitted with a special distributor having a unique ignition advance curve necessary to burn unleaded without harmful detonation. This distributor is available from Caterham Cars should you wish to adapt a non factory engine similarly.

We recommend that when normally running unleaded, one tankful in five is leaded to ensure adequate upper cylinder lubricant and that valve clearances are checked and adjusted at 3000 mile intervals. During the running in period use only LEADED fuel.

Vauxhall 2000cc 16 valve engines run on either unleaded or super-unleaded fuel, there is no need to use 4 star at any time.

FINAL CHECKS AND SERVICE INFORMATION

Running in should be carried out as follows:

Ford Engines:

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.	

Vauxhall Engines:

0-600 miles	4000 Max revs	No labouring
-------------	---------------	--------------

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

17.6 Service and Maintenance

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

It is, of course, possible to return your car to Caterham Cars or to any of our approved centres for servicing, but for those who wish to carry out their own maintenance a detailed Owner's Manual including all normal service information will be available from us shortly.

All Caterham Sevens should have an initial service at 500 miles (800 kms) followed by regular services at 3000 mile (5000 kms) intervals, or every 3 months as appropriate. Major services take place at 6000 and 12000 mile intervals. Please note that although Vauxhall recommend 9000 miles between oil changes, the

FINAL CHECKS AND SERVICE INFORMATION

Caterham installation uses a small oil filter which must be changed more regularly.

Electrical problems

At the rear of this section you will find a wiring diagram with an appropriate key and also a diagram showing the layout of the fuse box. In our experience 90% of electrical problems are caused by poor earth connections and therefore if you suffer a problem check the vehicle earthing points which are as follows:

- a) Battery to engine block (at right hand engine mounting Ford)
(at engine to bellhousing bolt Vauxhall)
- b) Gearbox bellhousing to chassis at 3 way brake union (Ford)
- c) Inlet manifold to chassis at 3 way brake union (Vauxhall)
- d) Instrumentation to chassis (at wiper motor securing bolt under dashboard)
- e) Rear lights to chassis (to rear wing securing bolts)

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 and report.

ENGINE

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

CLUTCH

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

BRAKES

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

STEERING AND SUSPENSION

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

ELECTRICAL SYSTEM

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

BODY

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

GENERAL

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

FINAL CHECKS AND SERVICE INFORMATION

CATERHAM CARS LIMITED

ASSEMBLY GUIDE AND VIDEO QUESTIONNAIRE

Guide dated July 1991

- 1) How would you describe your level of mechanical skill prior to building your Seven. Please tick as appropriate.

A	MINIMAL
B	LOW
C	MODERATE
D	HIGH

- 2) How useful did you find both the Assembly Guide and the "Building the Legend" video in building your car.

	ASSEMBLY GUIDE	VIDEO
--	----------------	-------

A	ESSENTIAL
B	HELPFUL
C	REFERENCE ONLY
D	INADEQUATE

- 3) Were there any areas in either that you particularly liked?
- 4) Were there any areas of construction that were not clearly explained?
- 5) Did you encounter any particular difficulties in building your car, and if so how did you overcome them?
- 6) Are there any areas within the Assembly Guide that could be expanded, or any areas not covered that you think should be?

Name:

Chassis No:

Date:

Pedal Box Specification

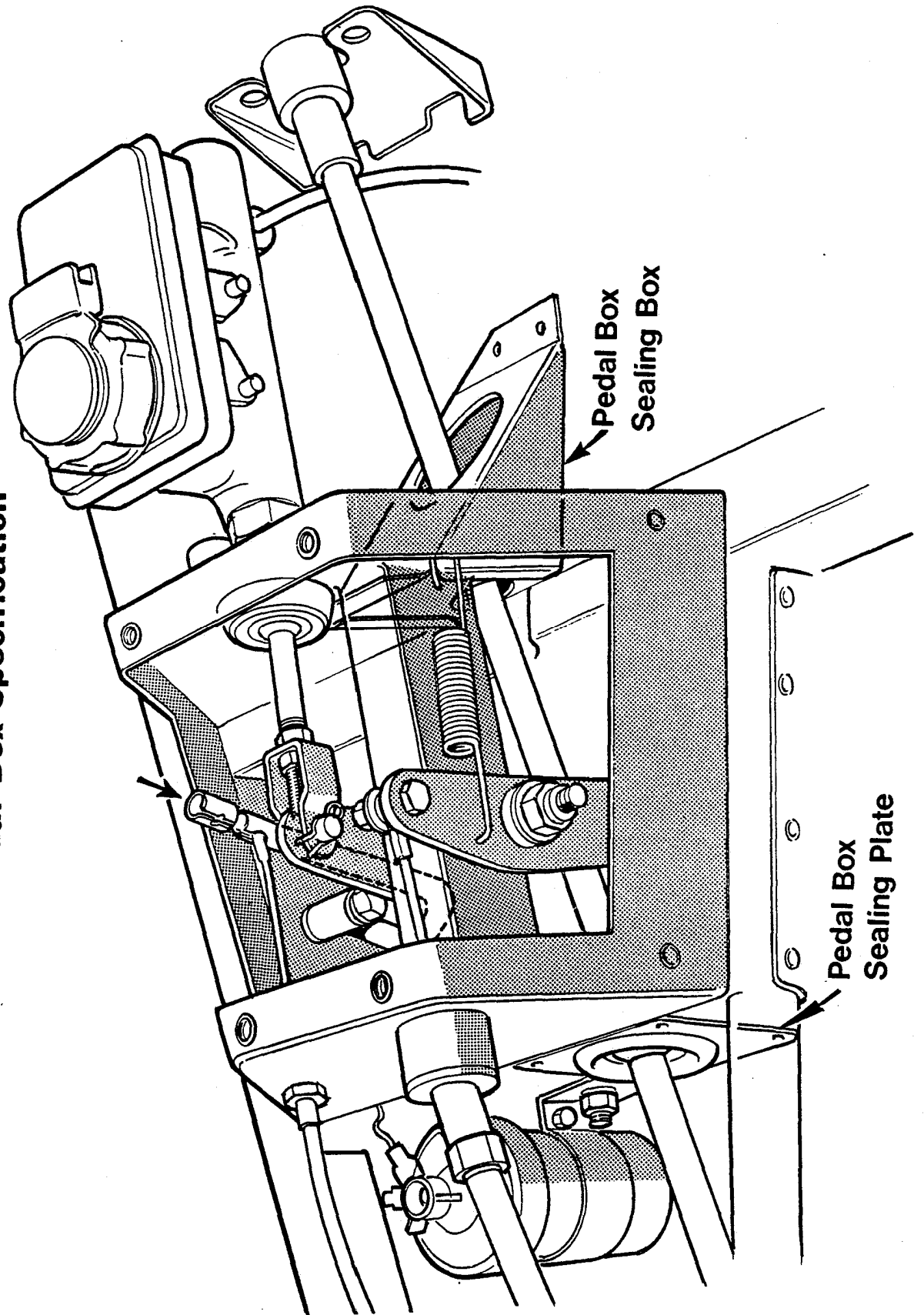
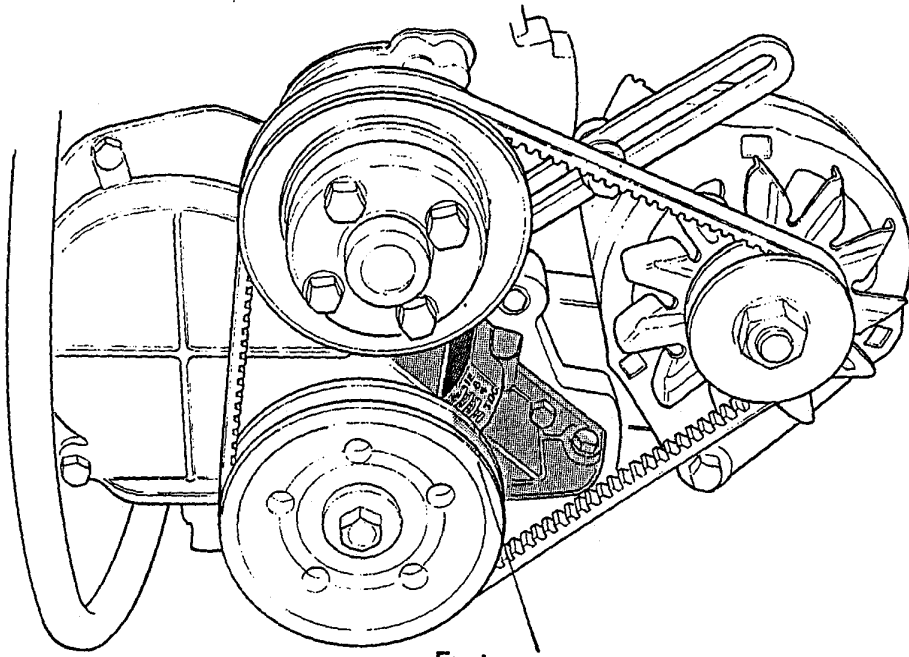


Fig. 17.2

Engine Timing Marks

Crossflow Engine



Engine shown at Top Dead Centre

Fig.17.3.1

Carburettor adjustment

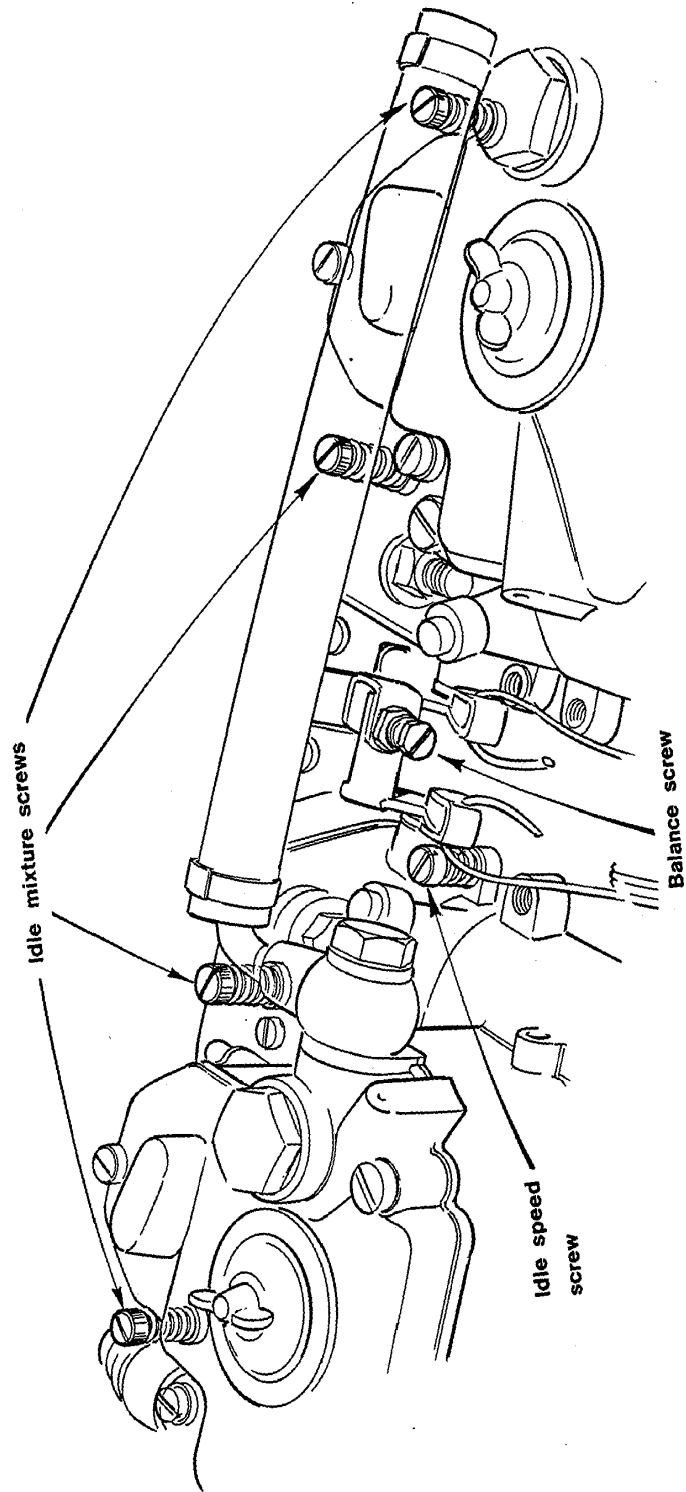


Fig. 17.3.2

UNDERBONNET SERVICE LOCATIONS

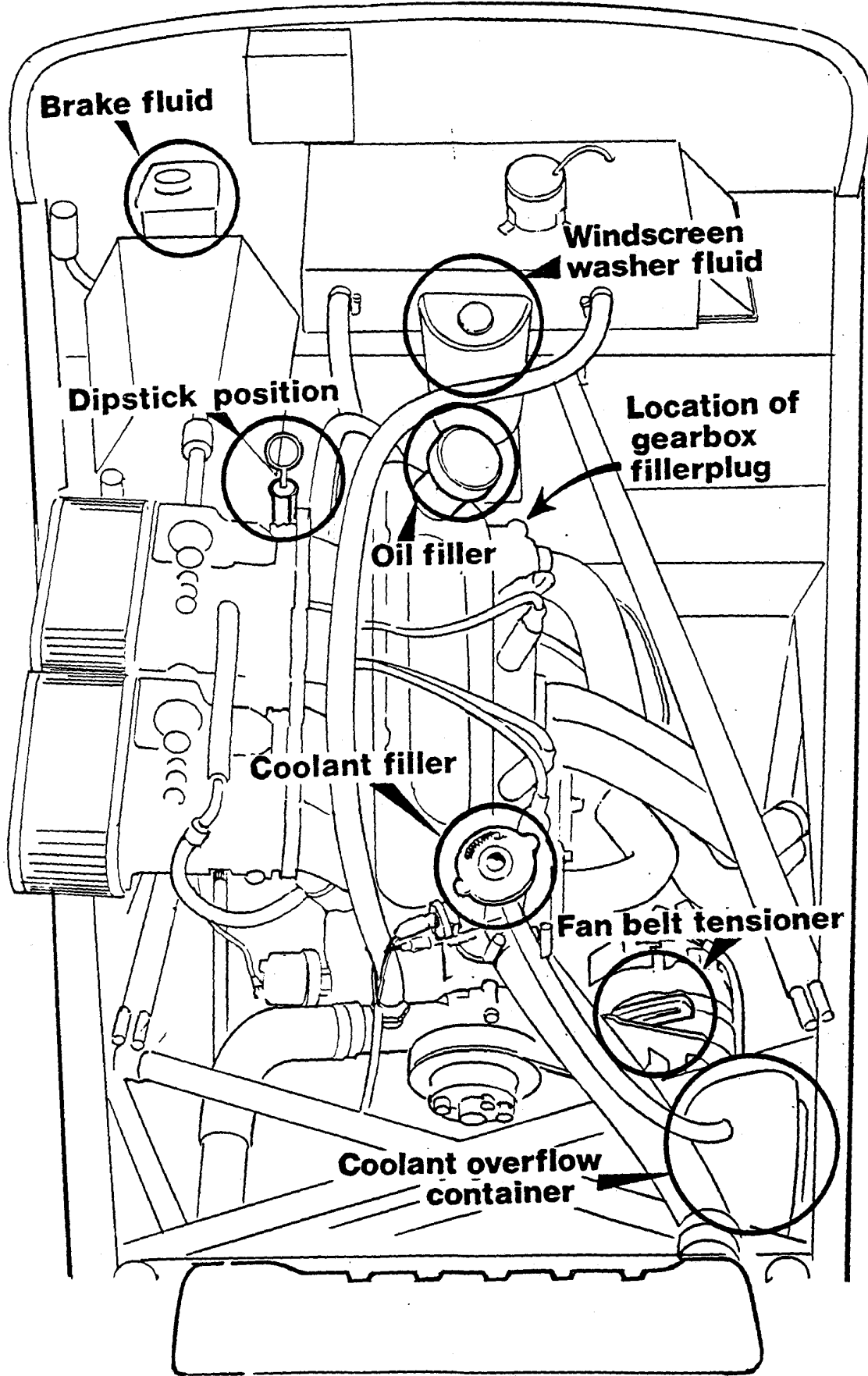


Fig. 17.5

DASHBOARD LAYOUT - RIGHT HAND DRIVE CARS

(N.B. LHD is mirror image)

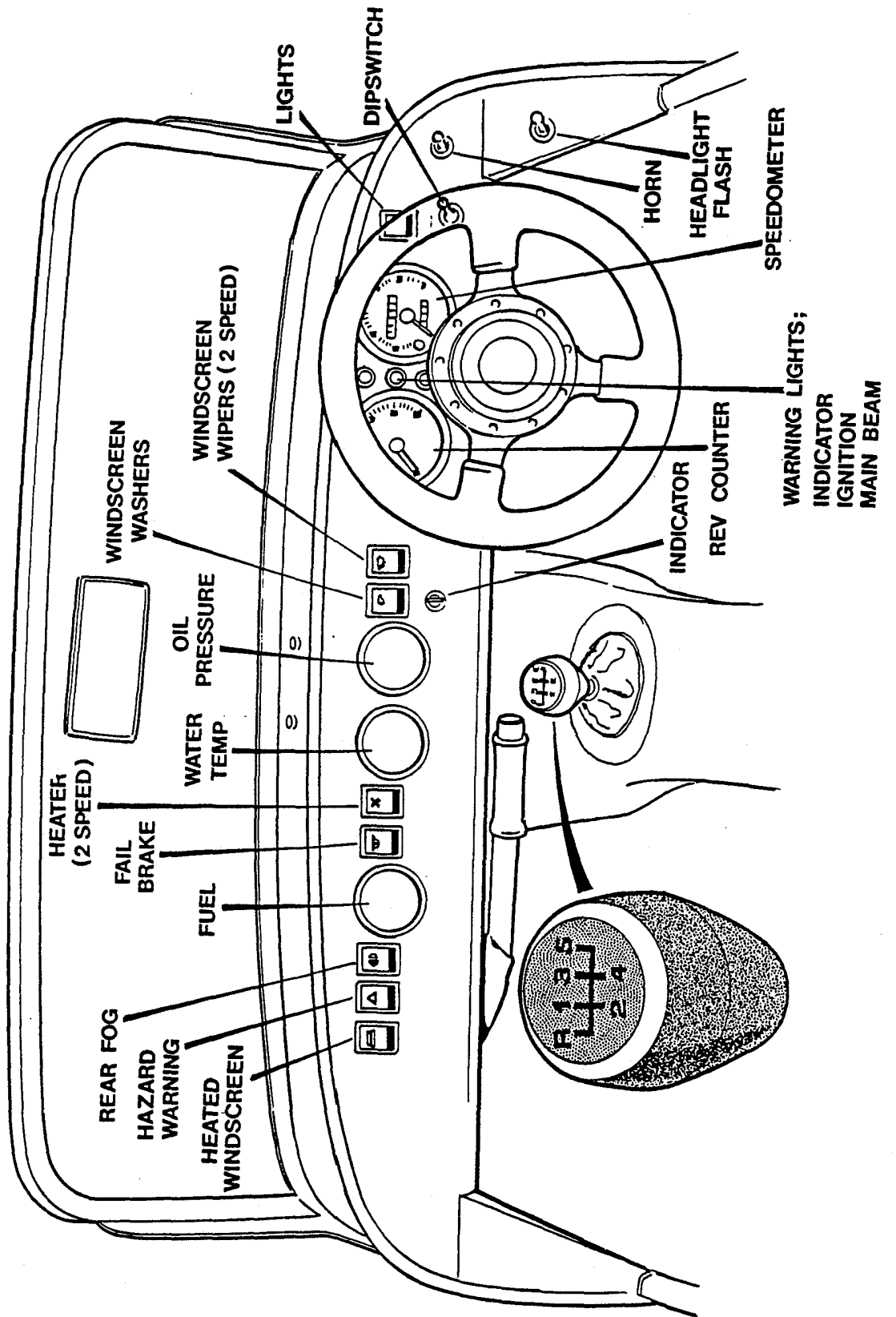
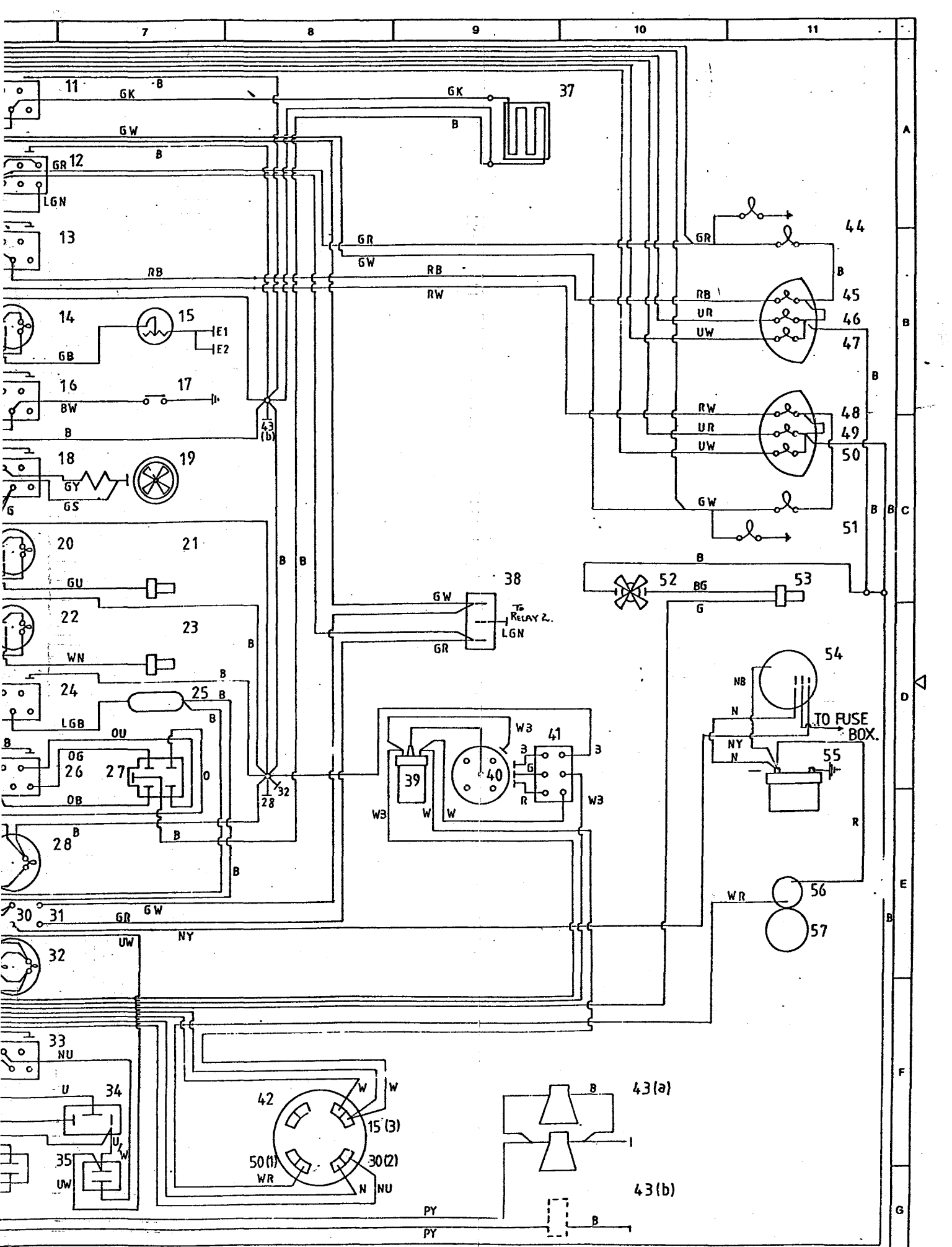


Fig. 17.6

FINAL CHECKS AND SERVICE INFORMATION

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 (b) Air Horns (Option)
15	Fuel Level Sender Unit	44	LH Front Indicator
16	Brake Test Switch	45	LH Side Light
17	Brake Fail Switch	46	LH Dipped Beam
18	Heater Switch	47	LH Main Beam
19	Heater 2 Speed	48	RH Side Light
	GY Slow	49	RH Dipped Beam
	GS Fast	50	RH Main Beam
20	Water Temperature Guage	51	LH Front Indicator
21	Water Temperature Sensor	52	Radiator Fan
22	Oil Pressure Guage	53	Radiator Fan Switch
23	Oil Pressure Sensor	54	Alternator
24	Washer Switch	55	Battery
25	Washer Motor	56	Starter Solenoid
26	Wiper Switch	57	Starter Motor
27	Wiper Motor		
28	Tachometer		
29	Main Beam Light		



TOLERANCES UNLESS STATED
 UNIT ± 0
 ± 0
 ± 0
 ± 0
 DIMENSIONS IN

NOTES
FOR KEY SEE NOTES.

SCALE: © COPYRIGHT
 DRAWN BY 11/1
 DATE 13-01-88

CATERHAM CAR SALES
 TITLE
WIRING DIAGRAM
SUPER SEVEN SERIES III OCT 90

DRAWING NUMBER
CCS-001-A
CCS 001 B
 ISS.
A.N.

1

2

3

4

5

DRAWING NUMBER

ANGLE PROJECTION

RW

W

G

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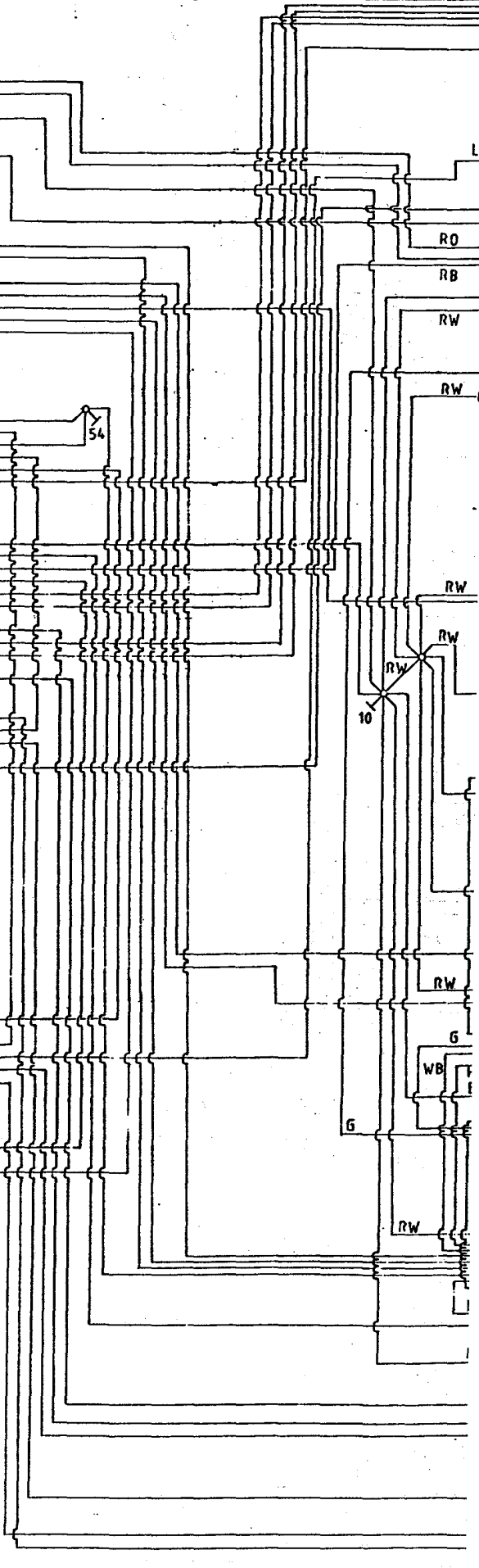
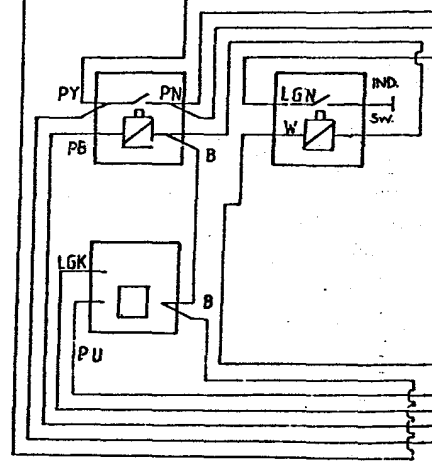
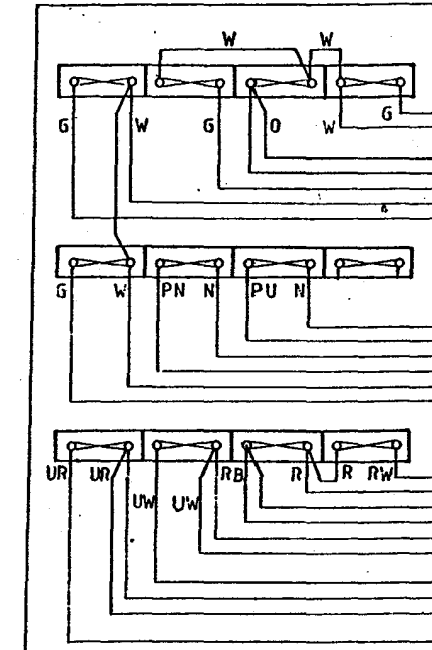
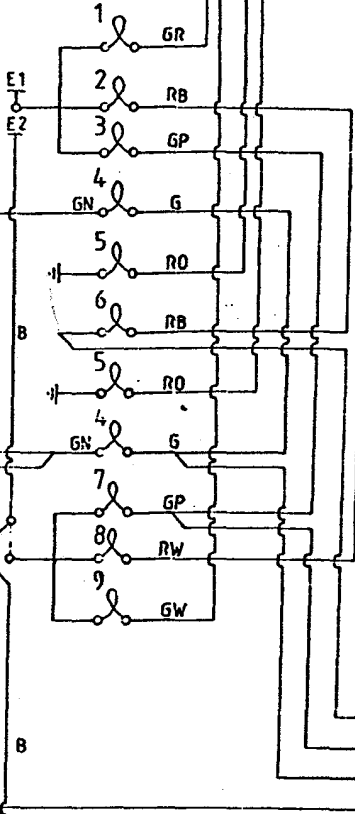
GP

G

GN

B

10



ISSUE	DATE	MOD. No.	ISSUE	DATE	MOD. No.

MATERIAL
FINISH

INDEX TO COMPONENTS

ITEM	SECTION	PAGE	REFERENCE
'A' Frame (live axle)	8	4	3.5
'A' Frame (De Dion)	7	7	4.5
Accident damage	16	18	5.2
Aeroquip	9	2	1.4
Alternator	10	17	7.1
Anti-roll bar (front live axle)	5	1,2	1.4,2.3
Anti-roll bar (front De Dion)	5A	4	5.0
Anti-roll bar (rear)	14	8	5.1
Axle Live (sourcing)	2	3	
(modification)	2	5	
and	8	1	8.1
(fitting)	8	2	2.1
(baffling)	16	14	4.5
BARC	16	3	1.2
BRSCC	16	3	1.2
Battery master switch	14	17	13.0
Bearings, wheel (front)	4	4	5.2
(rear)	7	3	3.3
Boot floor (live axle)	12	1	1A.1
Boot floor (De Dion)	12	1	1B.1
Boot cover	14	10	8.0
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
Build safety precautions	3	9	12
Caliper (front)	4	6	6.2
Carburettor set-up	17	6	3.2
Carpeting	12	2	2.1
Chapman Colin	1	3	
Chassis (ordering)	2	1	
Cibie headlamps	14	4	2.0
CKD kits	2	8	
Clutch cable	10	3	1.7
Clutch adjustment	10	8	3.5
Clutch Hydraulic (LHD)	10	10	3.9
Coil	9	10	4.5
Cooling system (Ford)	10	14	6.1
Cooling system (Vauxhall)	10A	10	4.5
Contents kits	2	rear of section	
Cycle wings	4	4	4.3
and	9	15	5.6
Dampers (rear De Dion)	7	7	4.3
(rear live axle)	8	4	3.1
Dampers (adjustable platform)	14	16	12.0

INDEX TO COMPONENTS

	SECTION	PAGE	REFERENCE
De Dion tube	7	3	3.1
Differential	7	1	2.1
Discs (rear)	7	5	3.6
Distributor	10	18	7.6
Easibleed kit	9	4	1.7
Engine ordering	2	1	
Engine specifications	2	rear of	section
Engine installation DD 5 speed	10	5	3.1
DD 4 speed	10	13	5.1
LA 4 speed	10	11	4.1
Vauxhall	10A	3	3.0
Exhaust (Ford)	10	20	8.1
Exhaust BDR (competition)	14	6	5.0
Exhaust (Vauxhall)	10A	10	4.4
Fan switch	10	18	2.4
Fire extinguisher	16	9	2.6
Fireproofing (rear boot)	16	7	2.3
Fireproofing (front bulkhead)	16	8	2.4
Floor impact protection	14	23	17.0
Fog lights rear	11	4	3.1
Front jacking points	3	rear of	section
Fuel filler	9	10	4.4
Fuel filler (flush mounted)	14	21	15.0
Fuel pump	18	2	2.0
Fuel tank protection	14	22	16.0
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	10	5.4
(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
Heater control valve	14	2	1A.1
Hood fitting	13	1	1.1
erection	13	8	5.1
folding	13	8	5.2
increased visibility	13	7	4.6
Horn	8	8	4.2
Horn air	14	8	6.0
Hub (front)	4	4	5.0

INDEX TO COMPONENTS

	SECTION	PAGE	REFERENCE
Ignition electronic	14	9	7.0
Ignition timing (Ford)	17	5	3.1
Indicators (front)	11	8	7.1
(repeaters)	11	5	5.1
Inspection service	17	8	4.0
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	
Oil	17	1	1.3
Oil cooler	14	4	4.1
Oil pressure switch	10	18	7.5
Oil catch tank	16	10	2.8
Painting	3	4	9
Pedal adjustment	17	2	2.1
Post build check	17	8	4.0
Propshaft (De Dion)	7	1	2.3
(live axle)	10	11	4.1
Queries to Caterham	2	9	
RAC Motor Sports Association	16	2	1.1
Radiator	10	14	6.2
Radiator hoses	10	15	6.4
Radius arms (De Dion)	7	6	4.3
(live axle)	8	4	3.4
Registration	15	1	
Reverse gear stop	10	11	4.4
Reversing lights	11	3	2.1
Reversing light switch	10	2	1.5

INDEX TO COMPONENTS

	SECTION	PAGE	REFERENCE
Ride height	14	-	Fig.14.12
Road and Sportscar Components	17	9	17.4
Rollover bar	16	6	2.1
Running in	17	10	5.0
Safety precautions	3	8	11
Seating	12	5	3.2
Seating (competition)	16	15	4.6
Servicing	17	11	6.0
Seat belts	9	12	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	17	7.2
(inertia)	10	19	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	17	7.3
Throttle return spring	16	10	2.7
Tonneau cover	14	11	9.0
Torque settings	3	4	4
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
Windscreen washers	9	8	4.1
Wind deflectors	14	15	11.0
Wings fitting	9	14	5.6
Wing protectors	14	4	3.1
Wiper delay unit	14	21	14.0
Wiring engine	10	16	7.0
Wiring diagram	17	rear of section	
Wiring faults	17	12	6.0
Wishbone (front lower)	5	3	3.1
Wishbone (front upper)	5A	4	3.1
Wheels	2	6	