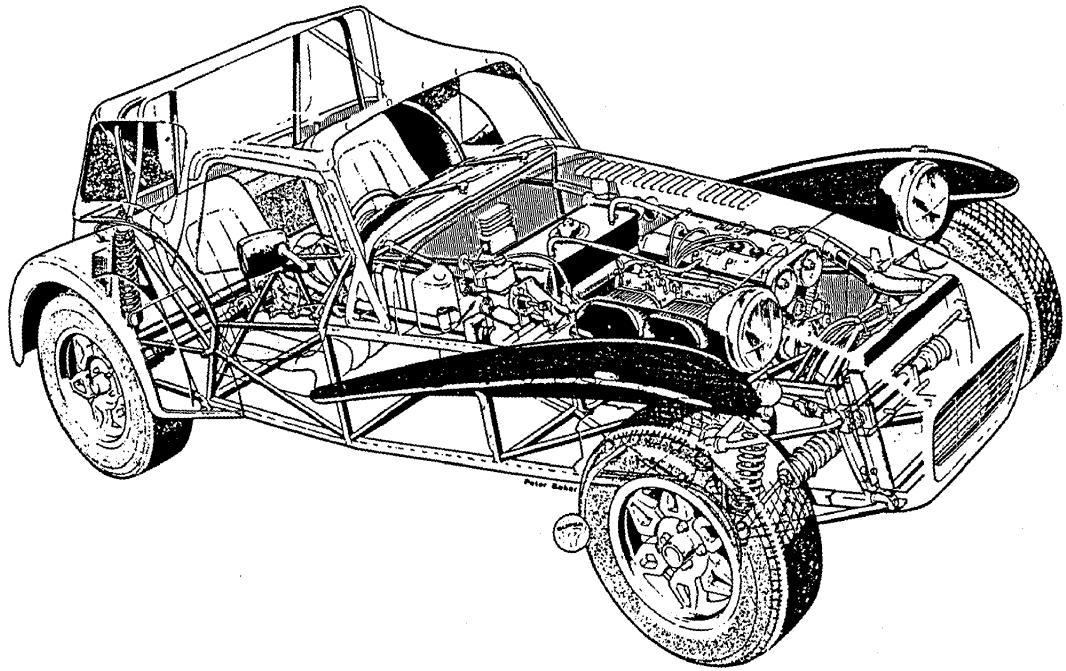




ASSEMBLY GUIDE

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 accommodate 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 choses 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.
-----------------------	---

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

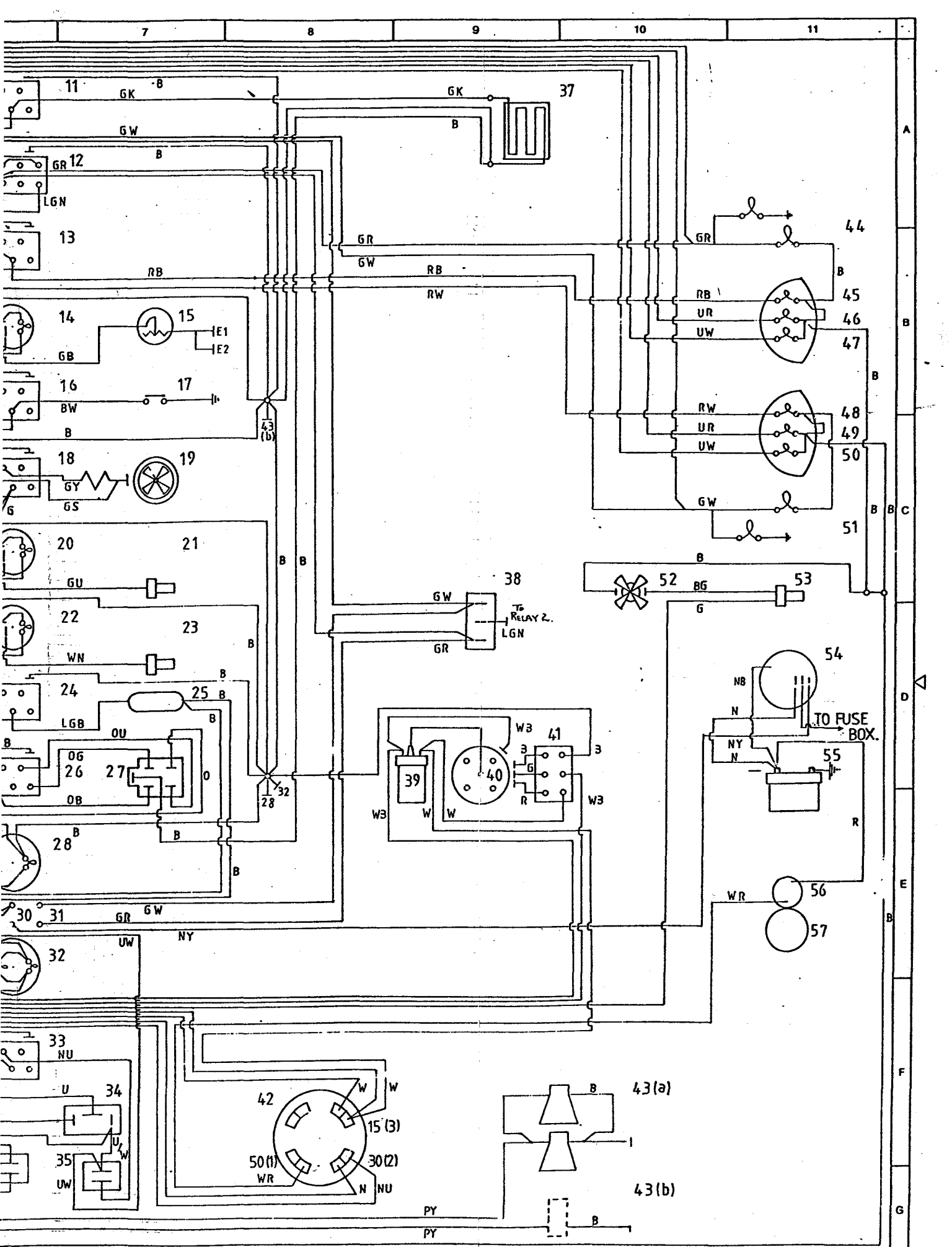
- 4 Aluminium seat spacers for fitment of adjustable seats
- 1 Pedal box sealing plate (front) with grommet
- 1 Pedal box sealing plate (rear) with grommet
- 1 Pedal box top plate (usually fitted)

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)



DIMENSIONS UNLESS STATED

UNIT	± 0
	± 0
	± 0
	± 0
	± 0

DIMENSIONS IN

NOTES

FOR KEY SEE NOTES.

SCALE: 1:1

DRAWN BY: [Signature]

DATE: 13-01-88

© COPYRIGHT CATERHAM CAR SALES

TITLE: WIRING DIAGRAM

SUPER SEVEN SERIES III OCT 90

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

