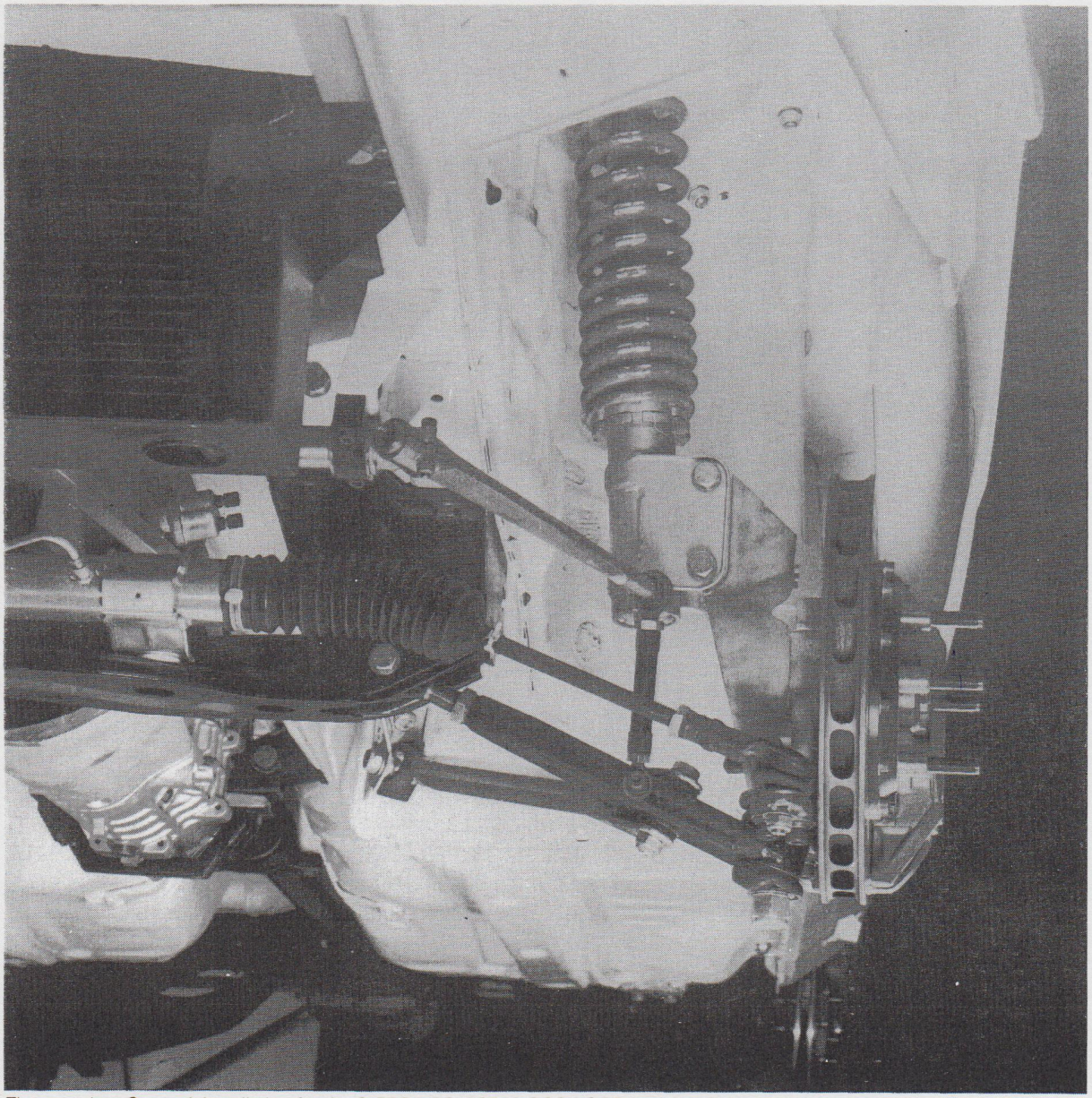
FRONT SUSPENSION

Most of the work on SIERRA front suspension has concentrated on that suitable for use in Group A competition. The reasons are as follows:

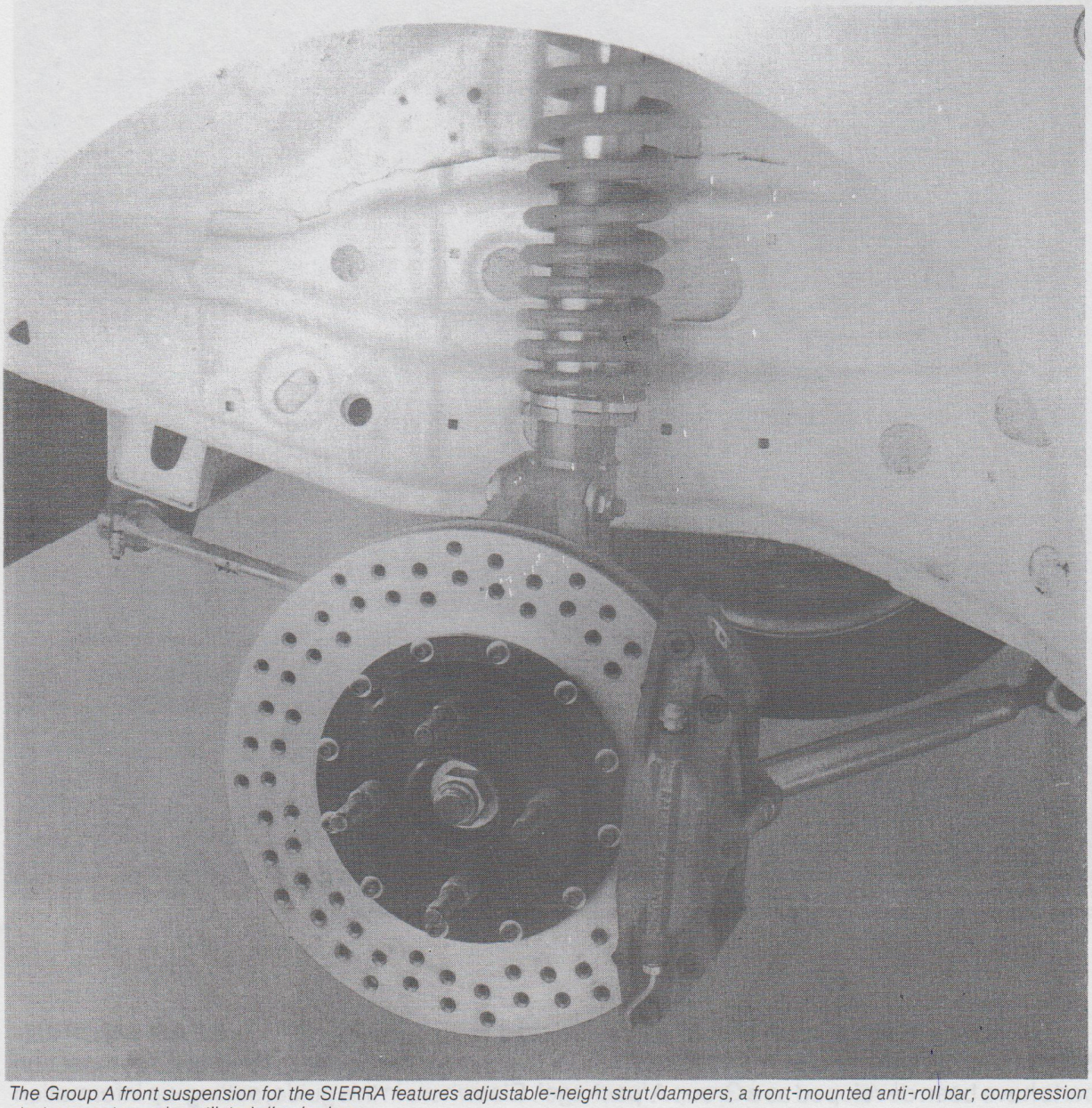
On Group N cars, the regulations require that the standard road-car layout of springs, dampers and linkage must be retained. The only changes authorised are to the spring rates and to the damper settings. The anti-roll bar stiffness may not be changed.

On Group A cars more radical changes are authorised, but all new items - such as suspension uprights, different anti-roll bars and different front suspension linkages - must be homologated and illustrated on the homologation form. Accordingly, to optimise the SIERRA models and to allow the widest authorised wheel/tyre combinations to be used, a competely new front suspension assembly has been designed.



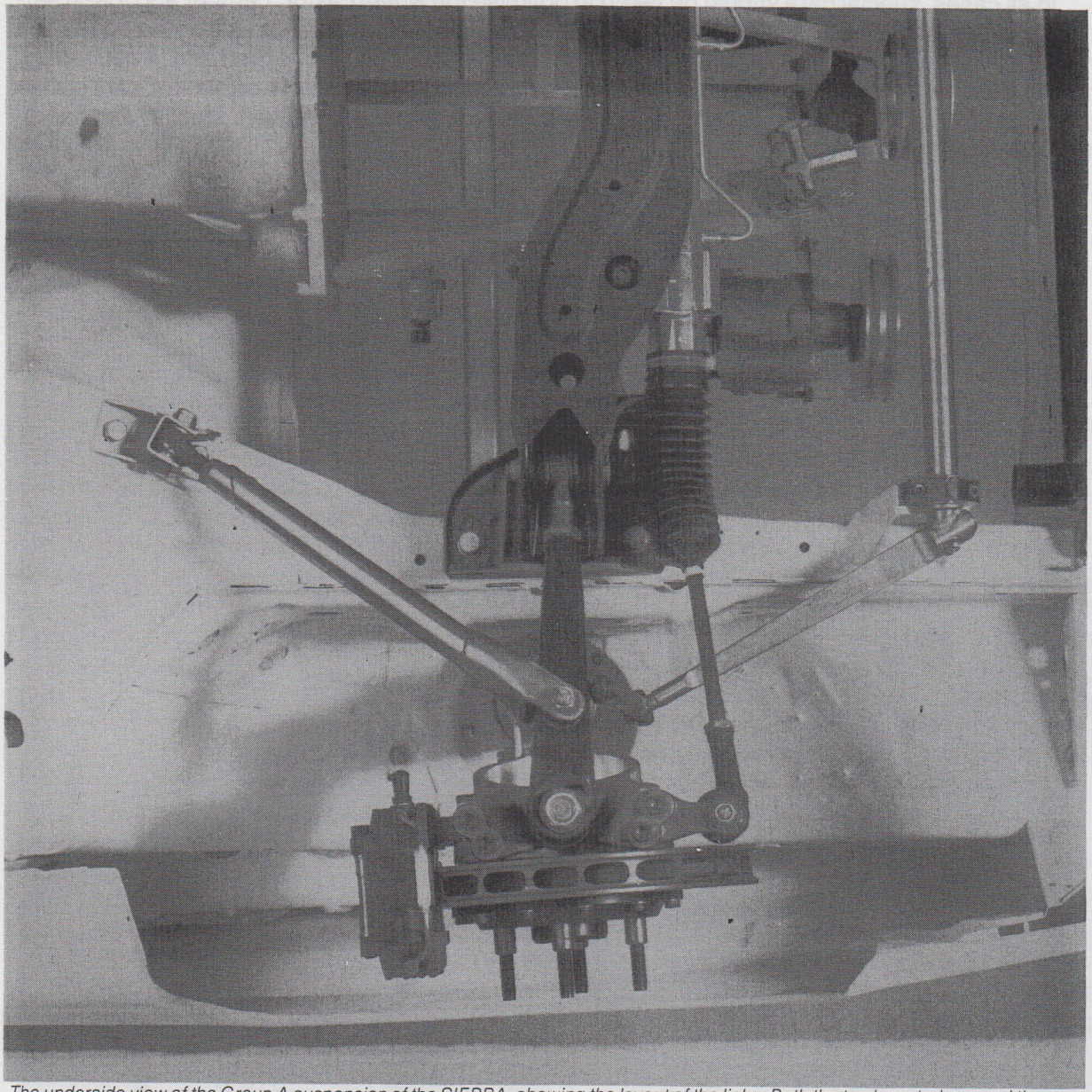
The complete Group A installation for the SIERRA RS/RS500 COSWORTH model. The same basic design is used for the SIERRA XR4 × 4, except that there is also a front drive shaft in the assembly and a different front crossmember.

In all cases, special care should be taken to optimise the wheel castor, camber and toe-in settings. If a competition SIERRA has been involved in any sort of accident, or has hit the edges of a race track or rally stage, the car's suspension geometry should be re-checked and, if necessary, re-adjusted, as soon as this is practicable. Extensive testing by the factory on 'works' cars shows that slight differences in settings can make a measurable difference to the cars' stability and handling characteristics.



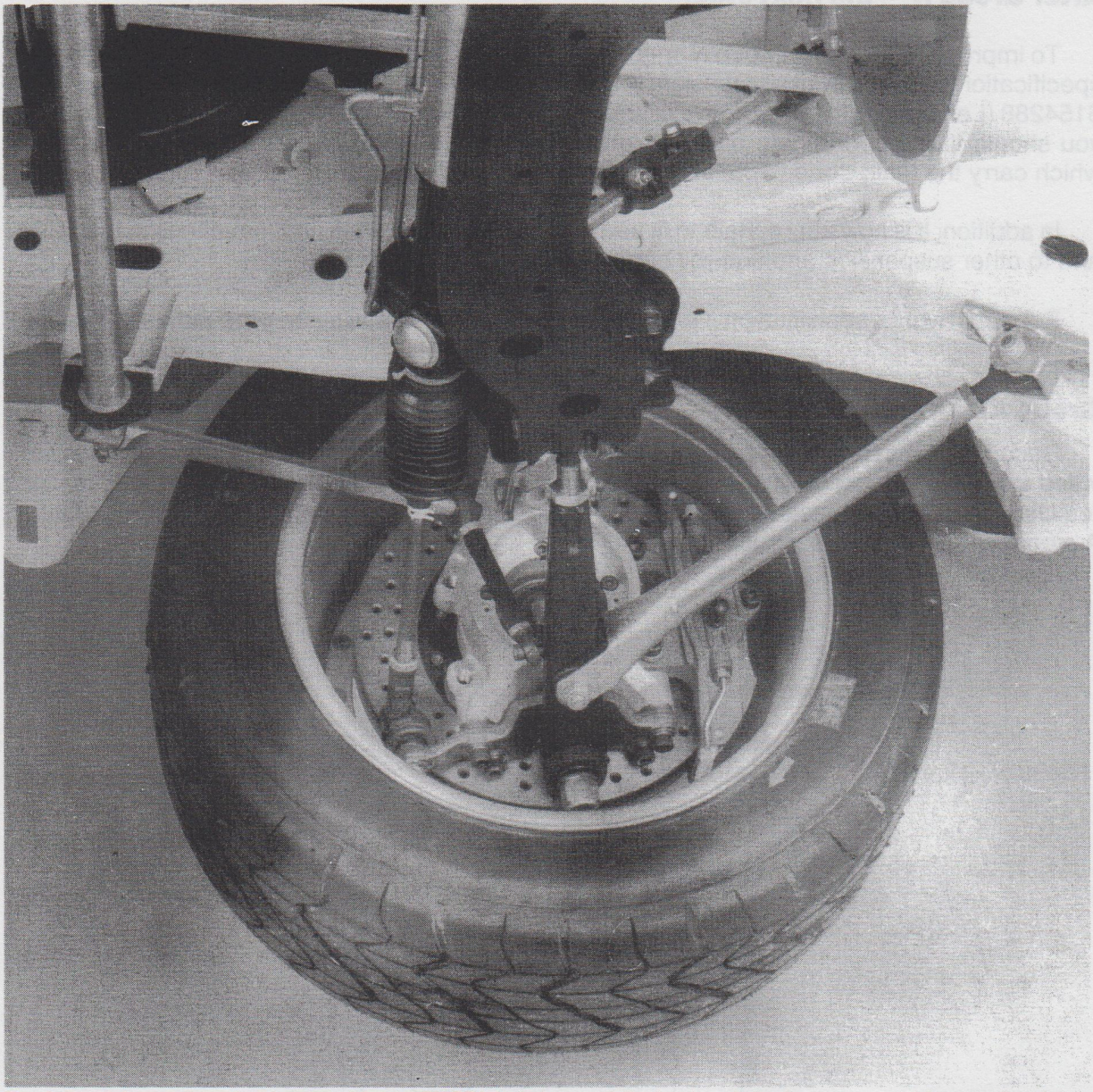
The Group A front suspension for the SIERRA features adjustable-height strut/dampers, a front-mounted anti-roll bar, compression strut geometry and ventilated disc brakes.

The car must always comply with the minimum height dimensions stated on the homologation papers. This is more important to those setting up their cars for racing, rather than rallying where clearances tend to be greater and surface conditions are more variable. Always set up the car so that there is adequate ground clearance on full bump; under skid shields, other protective plating, exhaust pipes, cooling ducts and, pipe runs - not forgetting the bodywork in the region of the wheel arch edges. This is especially important for rally cars or other 'off-road' machines used on loose or rough surfaces.



The underside view of the Group A suspension of the SIERRA, showing the layout of the links. Both the track control arm and the compression strut are adjustable for length - this allows the castor and the camber to be changed.

The advice in this section should always be read in conjunction with the **REAR SUSPENSION** (next section), and with **STEERING** (near the back of the booklet), for all such competition parts have been developed as a Group A 'package'. Elsewhere in this guide, setting-up information is provided for a variety of SIERRA motorsport applications. This data has been developed on the 'works' cars in actual competition, and shows what is considered to be an acceptable balance for different conditions. Please note that in every case, the 'setting-up' information has evolved around the use of 15in. road wheels (RS COSWORTH Group N), and 16in. road wheels (Group A), along with Pirelli or Michelin competition tyres.



The Group A front suspension developed for the SIERRA includes specially-developed steering arms, uprights, and other details.

Group N:

Work should be concentrated on changing the strut, by fitting different springs and dampers. The uprights should also be carefully selected so that the optimum negative camber is achieved at the road wheel. On production components there are small differences in the angle at which strut bodies enter upright castings.

For rallying, we recommend that you fit a Bilstein damper. This is the most durable type known to Ford Motorsport engineers. The recommended damper has settings of 300-100 on the Bilstein test rating. To go with this damper, use upper spring platforms 9090140.

The position of the lower spring platform, which must be fixed to the strut body (the rules make it clear that for Group N purposes, the ride height may not be adjustable), depends on the spring chosen. For rallying, a suitable spring has a rate of approximately 79 N/mm, or 450 lb/in. In any case it will be necessary to produce special spring platform upper bearings and plates.

There are two alternative bump stops available from the Motorsports Parts Division - one with a 50mm length (which is suitable for tarmac and smooth gravel events), the other with an 88mm length (a heavier-duty component suitable for rough 'Safari' type events).

After Group N — the next step:

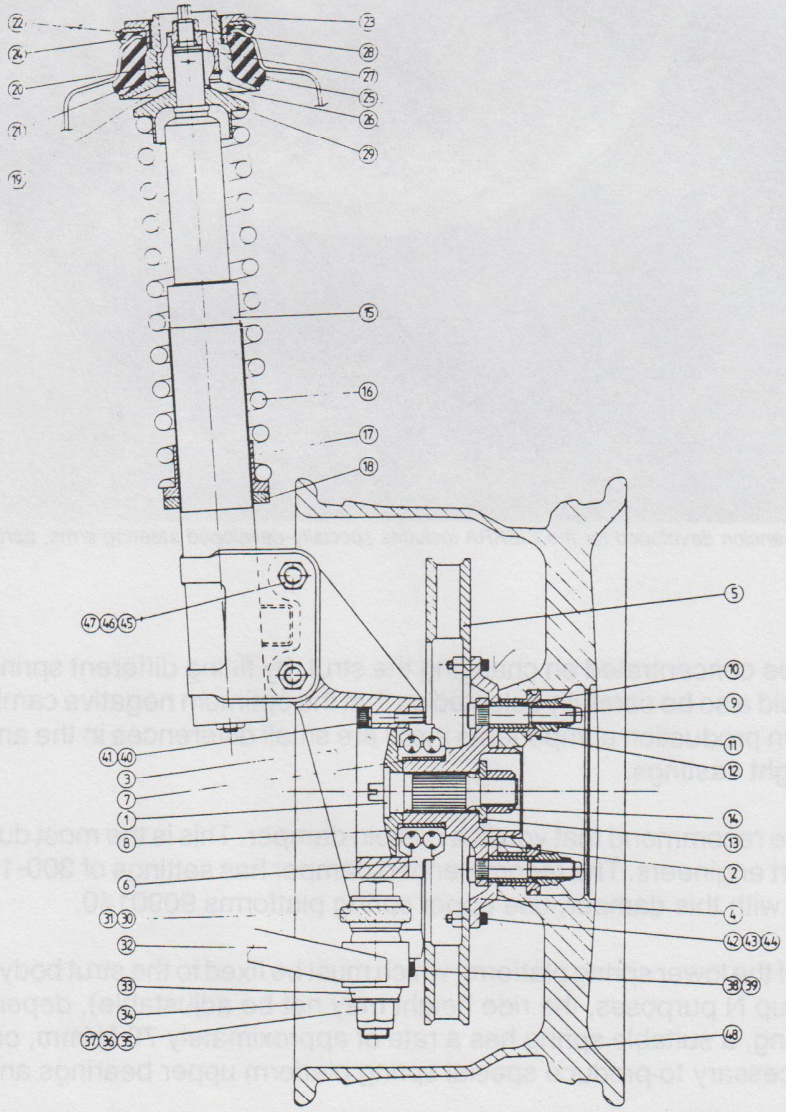
To improve further on a Group N specification, but without converting the car to a full ' works-specification' Group A front suspension; fit track control arms having the Finis Code 6154287 and 6154288 (Left and Right). These give slightly increased wheel negative camber. To match these, you should fit the appropriate ball-and-rod ('drumstick') assemblies to the steering arm ends, which carry the Finis Code 6135757.

In addition, it is now appropriate to fit heavy duty insulator bushes and mountings to the TCAs, and to other suspension and anti-roll bar positions.

For a full 'works-specification' Group A front suspension installation, proceed as follows:

Group A:

Because design and development work on Group A suspension for SIERRA models has provided a complete package of changes, every item of equipment must be fitted to ensure the best results. The SIERRA models handle best of all if the Group A front suspension is matched to Group A steering, brakes and rear suspension.



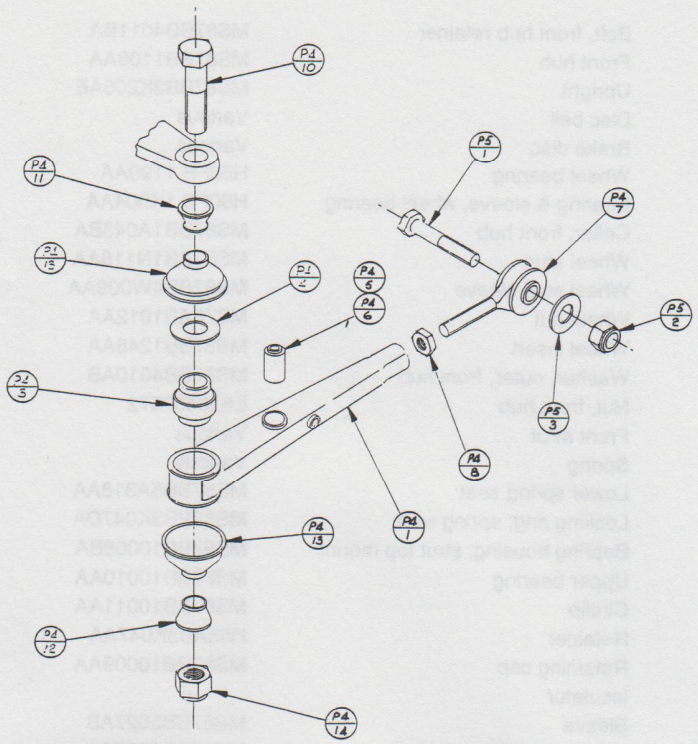
The complete Group A Front Suspension developed for SIERRA models. The drawing shows the SIERRA RS COSWORTH installation. The SIERRA XR4 × 4 installation is virtually the same, except that there is a front drive shaft inside the front hub.

Front Suspension: SIERRA RS COSWORTH

1	Bolt, front hub retainer	MS87BB4011BA	9092806
2	Front hub	MS87BB1106AA	9091971
3	Upright	MS87BB3K206AE	9093275
4	Disc bell	Various	Various
5	Brake disc	Various	Various
6	Wheel bearing	H80FB 1190AA	9094448
7	Bearing & sleeve, wheel bearing	H80FB 1K004AA	9094449
8	Collar, front hub	MS87BB1A043BA	9092805
9	Wheel stud	MS87BB1N118AA	9092068
10	Wheel stud sleeve	MS87BB4W009AA	9092069
11	Wheel nut	MS78AB1012AA	9094400
12	Wheel insert	MS87BB1245AA	9092112
13	Washer, outer, front hub	MS87BB4010AB	9092952
14	Nut, front hub	E620457572	1592315
15	Front strut	Various	Various
16	Spring	Various	Various
17	Lower spring seat	MS87BB5A318AA	9093328
18	Locking ring, spring seat	MS85PB3K047DA	9093179
19	Bearing housing, strut top mount	MS87BB10008BA	9092493
20	Upper bearing	MS87BB10010AA	9092809
21	Circlip	MS87BB10011AA	9092808
22	Retainer	H85AB3K047AA	9090137
23	Retaining cap	MS87BB10009AA	9092492
24/25	Insulator	—	6150277
26	Sleeve	MS87BB5527AB	9093260
27	Circlip, Bearing retaining	MS87BB5528AA	9092814
28	Sleeve nut, bearing retaining	MS87BB5526AA	9092489
29	Upper spring seat	MS87BB18010BA	9092487
30	Steering arm RH Cosworth	MS88BB3A052HA	9093176
31	Steering arm LH Cosworth	MS88BB3A053HA	9093177
32	Track control arm	MS87BB3798AE	9092421
33 - 37	Track control arm retaining hardware	see page 39	

It is not possible for a selection of the Group A components to be chosen and then fitted to existing road-car suspension linkages, as this cannot be done. The Group A front suspension is not merely an improved version of that used in standard road cars, but is the best that can be fitted within the space, the widest wheel/tyre combination, and the regulations which apply.

As far as possible, the front suspension package has been commonised between the SIERRA RS/RS500 COSWORTH, and SIERRA XR4 × 4 models. The same basic front hub, spring/damper units, and links are used in each case and no further changes are needed to accomodate the front-wheel-drive shafts. The aim has been to provide the most precise geometry, location and control of wheel movements: for that reason the only rubber used in the Group A suspension is found in the top-mount assembly. Instead of the simple MacPherson strut suspension found on the road cars, the Group A suspension features 'compression strut' location of the wheels, and the anti-roll bar kit has no locating function.



Details of the design of the Group A track control arm layout.

Track Control Arm - Group A Front Suspension

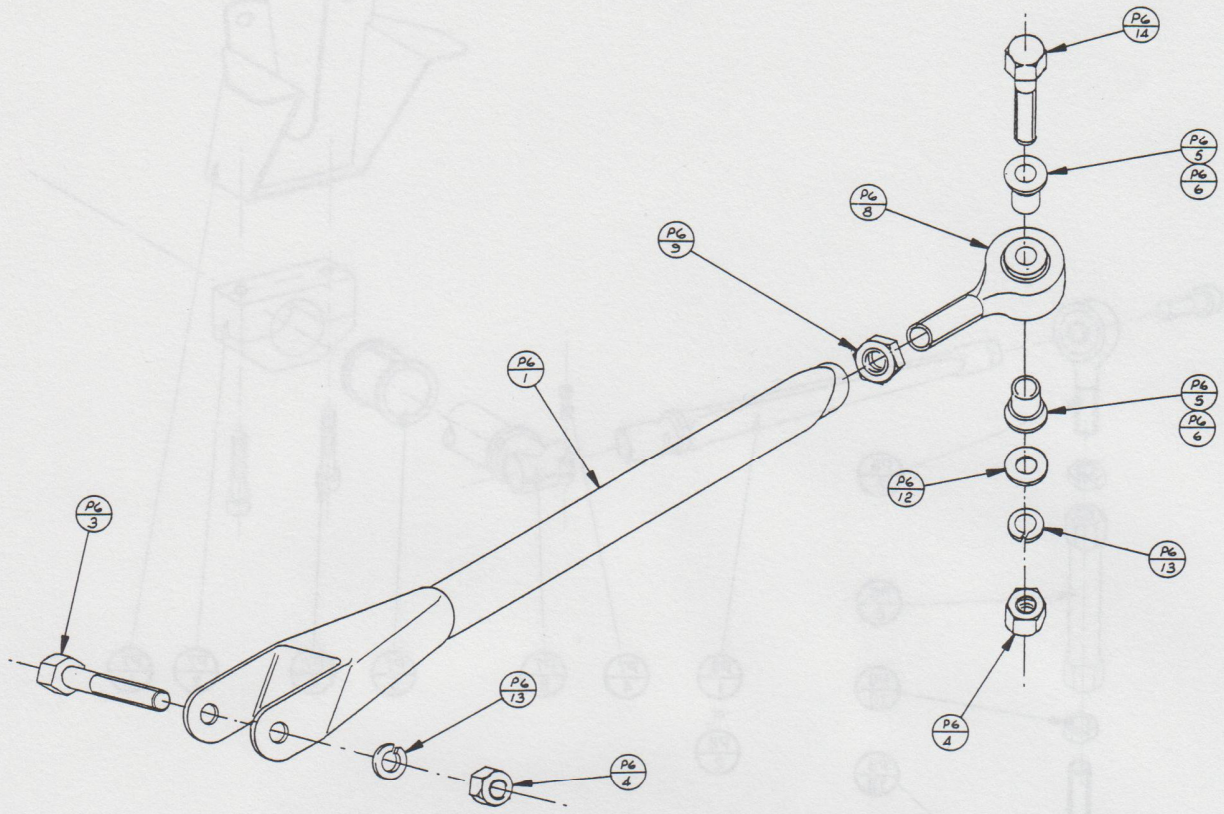
Drawing Reference	Component	Part No.	Finis Code
P4/1	Track control arm	MS87BB3798AE	9092421
P4/3	Bearing, Outer	H85PB3397AA	9092308
P4/4	Circlip	MS87BB3796AA	9092954
P4/5	Bush (soft)	MS87BB3797AA	9092366
or	or	or	or
P4/6	Bush (hard)	MS87BB3797BA	9092365
P4/7	Rod End	V85AB3K202AA	1627553
P4/8	Lock nut	MS182029S72	9091867
P4/10	Pin	MS87BB3352AA	9092236
P4/11	Spacer - Upper	MS87BB3353AB*	9092203
P4/12	Spacer - Lower	MS87BB3354AB*	9092219
P4/13	Gaiter	MS87BB3355AA	9093181
P4/14	Nut, Nyloc	—	1631207
P5/1	Bolt	—	1643196
P5/2	Nut	—	1629583
P5/3	Washer	—	6082613

* Upper spacer is for 4 × 4 only, RS Cosworth uses lower spacer in upper and lower positions.

All the parts developed for Group A use assume that the car will use 16in. diameter road wheels and tyres. While the Group A suspension itself may be fitted inside 15in. road wheels, the Group A steering system will not: this is further explained in the section on steering. Because the combination of Group A suspension and standard-car steering gives unacceptable steering geometry and bump-steer characteristics, cars should not be built to such a specification.

A separate anti-roll bar design, with links which may be adjusted for stiffness, is part of the recommended Group A installation.

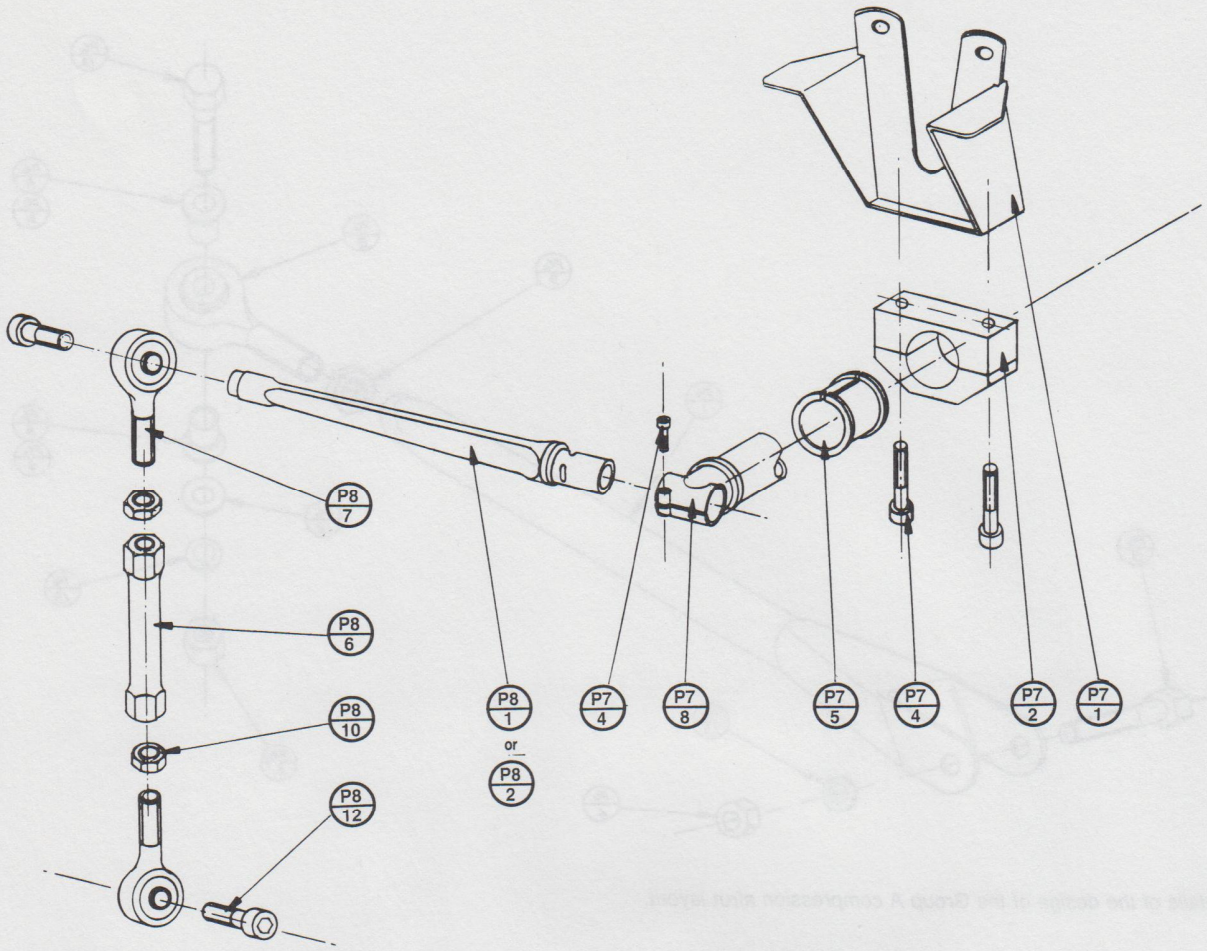
The Group A suspension design takes account of the widest wheel/tyre combination (10in./25.4cm) which may be used by the SIERRA RS/RS500 COSWORTH in motor sport, so that these do not protrude outside the envelope of the bodywork. Please note that as from 1 January 1988, the maximum wheel/tyre combination which may used on the SIERRA XR4 × 4 model is reduced to 9.0in./22.9cm.



Details of the design of the Group A compression strut layout.

Compression Strut - Group A Front Suspension

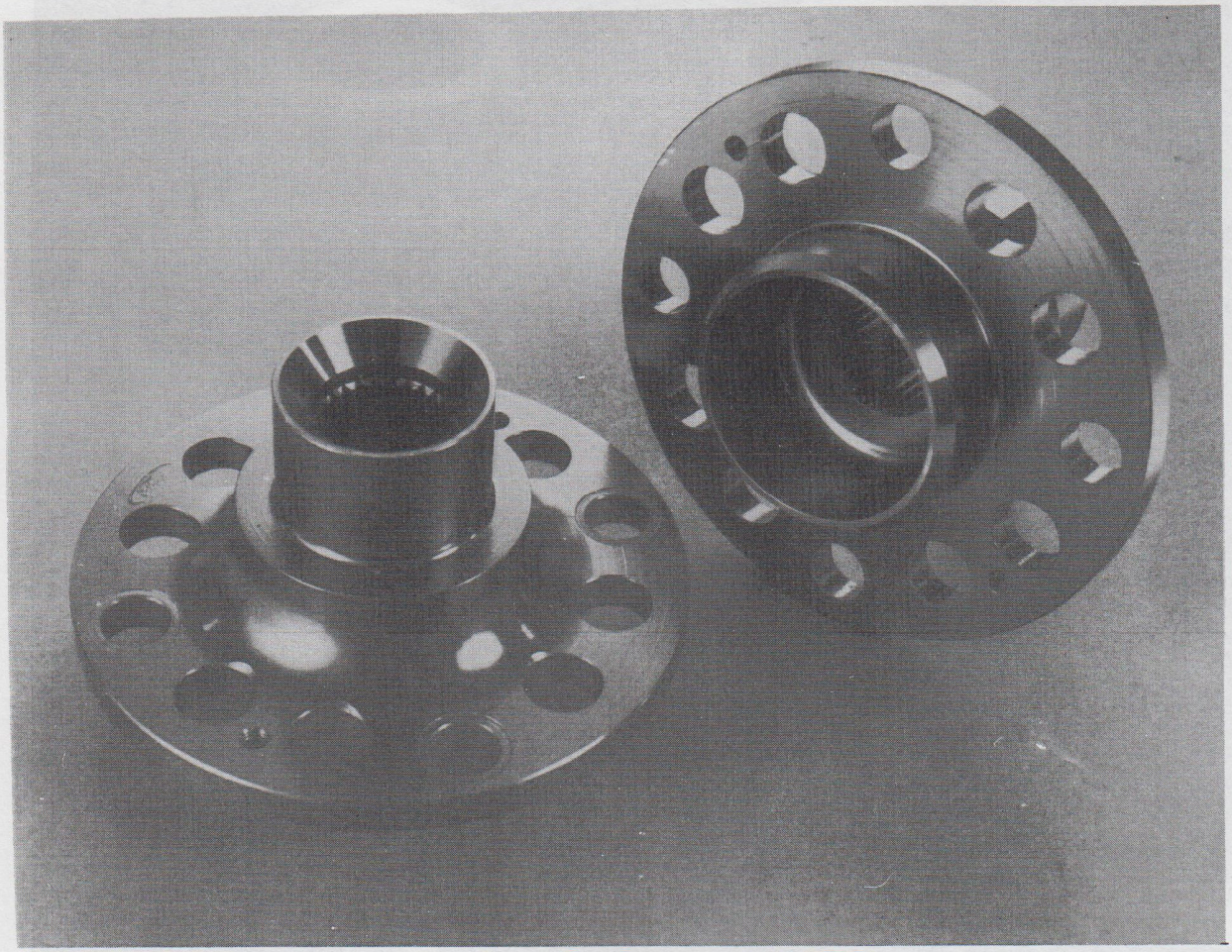
Drawing Reference	Component	Part No.	Finis Code
P6/1	Compression Strut	MS87BB4743AD	9092866
P6/3	Bolt	—	1553851 (Modified)
P6/4	Nut	—	6078595
P6/5	Insert, Rod End (Steel)	MS87BB4750BA	9092546
or	or	or	or
P6/6	Insert, Rod End (Aluminium)	MS87BB4750AA	9092547
P6/8	Rod End	H84AB3395AA	9090064
P6/9	Locknut	H84AB3396AA	9090063
P6/12	Washer	—	1571845
P6/13	Spring Washer	—	1505544
P6/14	Bolt	—	1454099



Details of the Group A anti-roll bar design. The same basic layout is used at front and rear.

Anti-roll bar assembly

Drawing Reference	Component	Part No.	Finis Code
P7/1	Anti-roll bar bracket	MS87BB5489AB	9092939
P7/2	Anti-roll bar bracket clamp	MS86PB5488AB	9092221
P7/4	Capscrews M6 × 35	—	1471512
P7/5	Bearing	MS86PB5484AA	9090660
P7/8	Anti-roll bar	Various	Various
P8/1	Anti-roll bar blade, RH	MS86PB5491AB	9092232
P8/2	Anti-roll bar blade, LH	MS86PB5490AB	9092233
P8/6	Drop Link	MS86PB5566AA	9090662
P8/7	Joint kit	H87BB5K566AA	9092450
P8/10	Locknut		
P8/12	Capscrew M8 × 25	—	—



The front hub, designed as part of the dedicated Group A Front Suspension for the SIERRA.

Note: The effective stiffness of the anti-roll bars can be varied by adjusting the anti-roll bar links from 'full-stiff' (when the blade faces to the side of the car) to 'full-soft' (when the blade faces downwards). A 50/50 reference in a setting-up chassis specification means that the blade is twisted half way between 'full stiff' and 'full soft'.

The front-end ride height quoted in the 'Setting-up Chassis Specification' pages should be measured from the centre line of the Inner track control arm pivot joint, to the ground. Although the SIERRA is not particularly sensitive to changes in ride height at the front, the recommendation is always to run as low as possible, while keeping in mind the vulnerability of the underside to damage.

Note that SWG (Standard Wire Gauge) is a British Imperial measurement which measures the wall thickness. The **lower** the SWG number, the **greater** the wall thickness of the anti-roll bar tubes.

SWG	Thickness (mm)	Thickness (in)
8	4.064	0.160
10	3.251	0.128
12	2.642	0.104
14	2.032	0.080
16	1.626	0.064