REAR SUSPENSION

As with the front suspension, most work on the SIERRA rear suspension has concentrated on making it even more suitable for use in Group A competition:

On Group N regulations require that the standard road-car layout of spings, dampers and linkage must be retained. The only changes authorised are to spring rates and damper settings.

On Group A cars, more radical changes are authorised, but all special new items - such as semi-trailing arms and different spring/damper components - 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, many new components have been made available.

Road Cars: Note that in the case of the SIERRA XR4 × 4 and the SIERRA RS COSWORTH models, there is no provision for toe-in adjustment. On the SIERRA RS500 COSWORTH model only, alternative pick up points are provided on the cross-member. One set is as found on standard road cars with standard trailing arms. The alternative points are provided **only** for use with homologated 'Group A' trailing arms, in motorsport events.

Competition Cars: Special care should always be taken to optimise the wheel camber and toe-in/toe-out settings, together with the ride height of the car. After an accident, or a 'kerbing' incident, the geometry should be re-checked and, if necessary, adjusted as soon as practical. Experience (of 'works' cars and from private owners) has shown that the semi-trailing arm is likely to distort after being struck hard.

Tests and actual competition experience shows that slight differences in settings and the vehicle's attitude, make a very significant difference to the handling and particularly to the traction of the car; this applies especially to the SIERRA RS/RS500 COSWORTH models.

The acceleration of the cars is always limited by the traction of the rear wheels. The best traction is always achieved by setting the car to run low at the rear and to use soft springs, so that it can squat when torque is applied to the tyres.

As with the front suspension, we offer the same advice on ride heights and homologation requirements. The car should always have adequate clearance, even on full bump, for chassis and underbody components, particularly the exhaust system, and any pipe-work associated with the fuel tanks, and the rear final drive. This is especially important for rally cars or other 'off-road' machines used on loose or rough surfaces.

The advice in this section should always be read in conjunction with that on **FRONT SUSPENSION,** as 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. Please note that in every case the Group A 'setting-up' information has evolved around the use of 16in. road wheels and Pirelli or Michelin competition tyres.

Group N Cars:

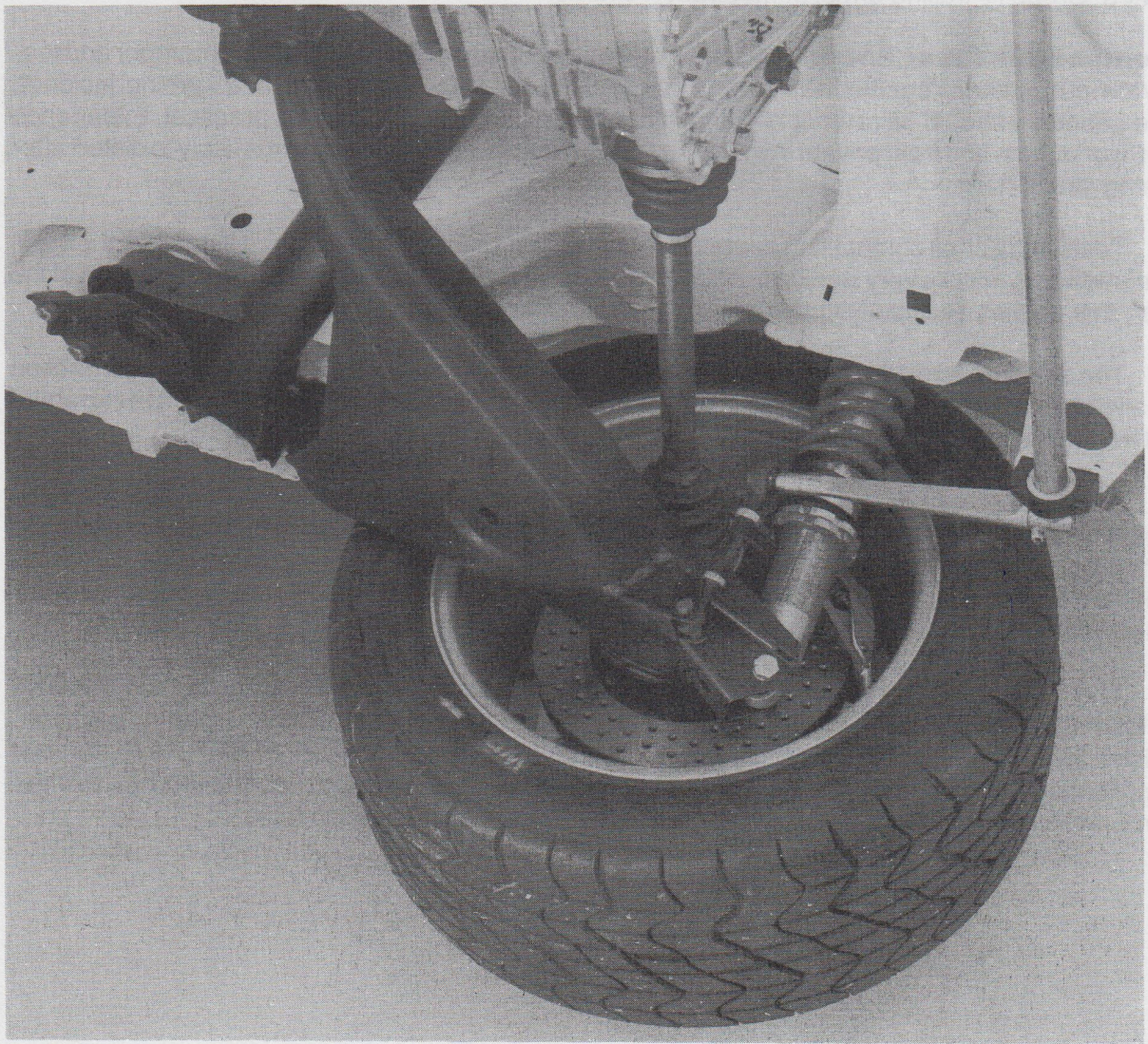
Please note that although springs and dampers may be changed, they must always remain in the standard position - i.e., the spring must fit between the semi-trailing arm and the body shell, while the damper must use the standard road car pick-up point on the semi-trailing arm, and the same mounting in the body shell; in other words it must be behind the line of the rear drive shafts.

To get the best possible traction and handling, it is important to use semi-trailing arms which have been specially selected, within manufacturer's tolerances; together with different rear springs. These should give a reduced wheel negative camber setting.

On-event rally experience has shown that the best rear springs should have a progressive rate of 250-650 lb/in. (44-114 N/mm) and that at standard ride height the rate should be about 53 N/mm 300 lb/in.

Two different types of Bilstein rear dampers are recommended, with similar settings. One is a Bilstein carrying the manufacturer's number of B36-0765, the other is the Group A type Bilstein damper (which is listed in the Group A section of the SIERRA COMPETITION PARTS booklet). The Group A damper, of course, is really intended to have springs mounted concentric with its body, but this is **not** authorised for Group N. The adjustable platforms provided with the Group A damper, therefore, are not needed in the Group N installation.

As with the Front Suspension, two different types of bump rubber are recommended, a 50mm/1.97in. type for tarmac/smooth gravel events, or a longer and more robust 75mm/2.95in. type for rougher, off-road, usage.



The Group A rear suspension for SIERRAs uses heavy-duty semi-trailing arms, concentric spring/damper units, and an anti-roll bar mounted behind the line of the rear axle.

After Group N - the next step:

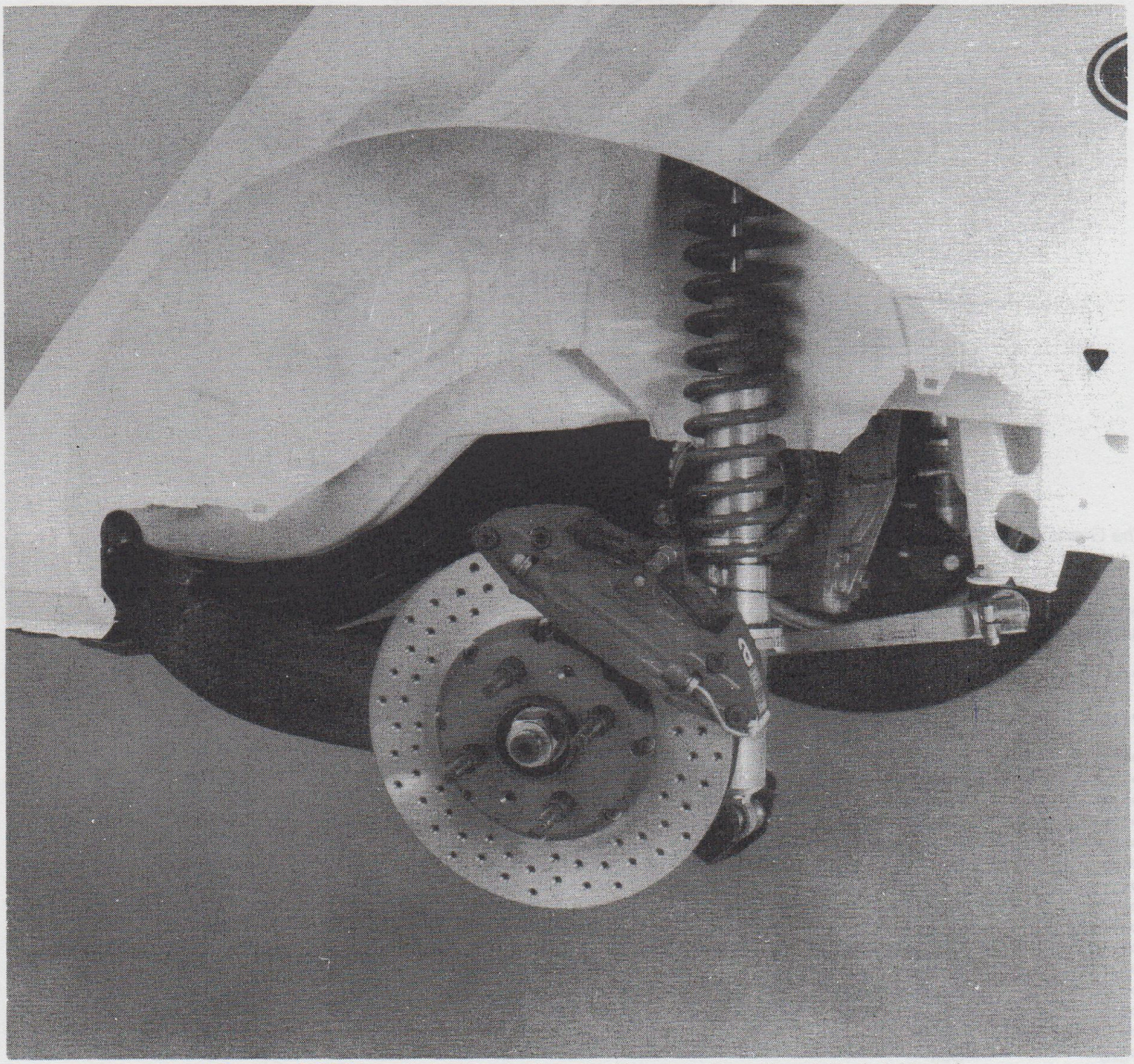
To improve further on a Group N specification but without converting the car to a full 'works-specification' Group A rear suspension, fit heavy duty insulators in the semi-trailing arm mountings, and to mount the rear axle itself, along with the alternative rear axle cross-member/body bushes.

Group A Cars:

In the design and development of special parts for Group A SIERRA models, the position of the rear cross-member which supports the semi-trailing arms, and of the rear final-drive casing and drive shafts, was unchanged. Changes made to optimise the rear suspension were made as follows:

New reinforced semi-trailing arms, including spherical joints to allow toe-in adjustment.

A range of new spring/damper units, designed to fit in the standard damper location. The standard location of the road-car road spring, therefore, has been abandoned. This allows more precise control over suspension and damping.

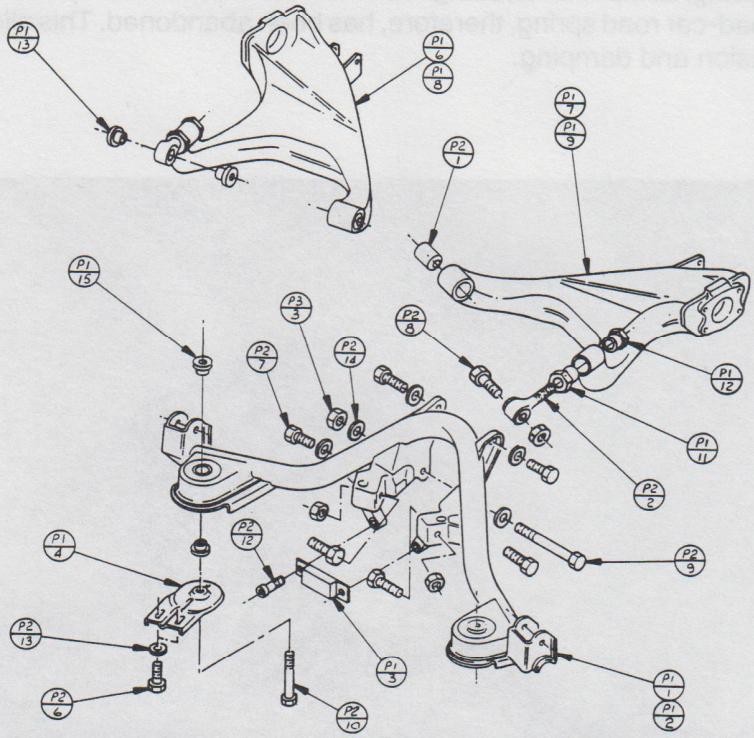


The rear suspension of Group A SIERRAs includes concentric spring/damper units, with variable-height platforms.

A range of adjustable anti-roll bars has been developed, for mounting behind the line of the final drive casing.

To get the best possible results from the SIERRA, the complete package of changes and special items, should be incorporated. The SIERRA models handle best of all if the complete Group A rear suspension is matched to Group A steering, front suspension, and brakes.

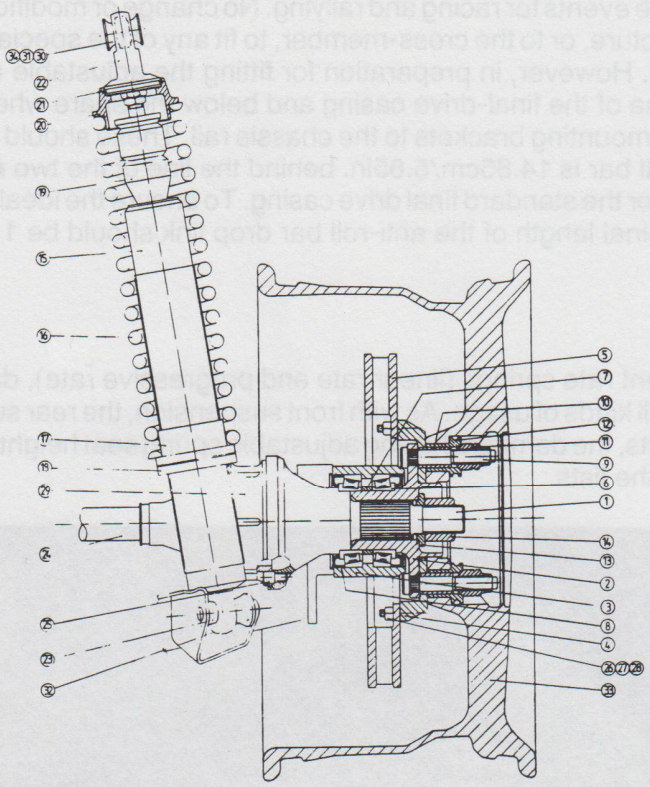
The Group A rear suspension package has been commonised between the SIERRA RS COSWORTH, and SIERRA XR4 × 4 models and is compatible with any of the final drive casings used in the model range. All the parts developed assume that the car will use 16in. diameter road wheels and tyres, though smaller diameter road wheels and tyres may also be used without further modification being needed.



The Group A rear suspension looks virtually identical to the standard, but many special parts are used.

Rear Suspension

Drawing Reference	Component	Part No.	Finish Code
P1/1	Rear suspension member assembly (Tarmac)	MS87BB5K574DA	9092763
P1/2	Rear suspension member assembly (Off-Road)	MS87BB5K574EA	9092764
P1/3	Tie bar, rear sub-frame	MS87BB5K576AA	9092759
P1/4	Steady plate (Front mounting)	MS87BB5K822BA	9092760
P1/6	Semi-trailing arm, RH, Tarmac	MS87BB5K742GD	9092943
P1/7	Semi-trailing arm, LH, Tarmac	MS87BB5K743GD	9092944
P1/8	Semi-trailing arm, RH, Off-Road	MS87BB5K742HD	9092941
P1/9	Semi-trailing arm, LH, Off-Road	MS87BB5K743HD	9092942
P1/11	Lock nut	MS87BB5221BA	9092538
P1/12	Sleeve nut	MS87BB5220BB	9092539
P1/13	Spacer	MS87BB5K496BA	9092945
P1/15	Insulator, rear S-F, front mounting	H85PB53033AA	9091464
P2/1	Bearing - inner	V86BB5A638AA	1643158
P2/2	Bearing - outer		9092562
P2/6	Screw	E602208S72	1451250
P2/7	Screw	—	1610179
P2/8	Bolt	—	6145599
P2/9	Bolt	—	6121268
P2/10	Bolt M4 - 1.5 × 75	—	—
P2/12	Screw - M10 × 20	—	—
P2/13	Washer	E630031571	1436268
P2/14	Washer	—	6144431
P2/15	Nut	—	1629583



The Group A rear spring/damper/hub/disc/wheel design.

Rear Suspension - Spring/Damper/Hub/Axle

Drawing Reference	Component	Part No.	Finis Code
1	Outer stub shaft - RH/LH	MS87BB4365AD/4K137AD	9092676/2675
2	Rear hub	MS87BB1109AD	9092768
3	Bearing housing	MS87BB4K017AC	9093175
4	Disc bell	Various	Various
5	Brake disc	Various	Various
6	Wheel bearing	MS87BB1238AA	9092367
7	Spacer, wheel bearing	Various	Various
8	Bearing & seal	MS87BB1239AA	9092817
9	Wheel stud	MS87BB1N118AA	9092068
10	Sleeve, wheel stud	MS87BB4W009AA	9092069
11	Wheel nut	MS78AB1012AA	9094400
12	Wheel insert	MS87BB1245AA	9092112
13	Washer, hub nut	MSA87BB4K371AB	9092620
14	Hub nut, RH/LH	MS87BB4K140AA/4K141AA	9092709/2711
15	Suspension damper	Various	Various
16	Road spring	Various	Various
17	Lower spring seat	MS87BB5A318AA	9093328
18	Locking ring	MS85PB3K047AA	9093179
19	Bump stop	Various	Various
20	Upper spring seat	H85PB 3475AA	9090862
21	Circlip, damper top	H85PB3474AA	9090863
22	Damper top	MS87BB18101AD	9093257
23	Damper insert ally/steel	MS87BB3811AA/3811JA	9092545/3274
24	Drive shaft	MS87BB4235BB	9093234
25	Cap Screw, drive shaft	—	—
26	Screw		
27	Nut — disc/bell retaining	MS87BB2001AA	9092107
28	Washer		
29	Outer C/V joint (drive shaft)	MS85PB4635AA	9093233
30	Circlip	MS87BB18111AA	9092815
31	Bearing	MS87BB18110AA	9092816
32	Damper inserts ally/steel	MS87BB3811HA/3811KA	9092544/3272
33	Road wheel	Various	Various
34	Insert, rear damper ally	MS87BB3811AA	9092545
	or Insert, rear damper steel	MS87BB 3811JA	9093274

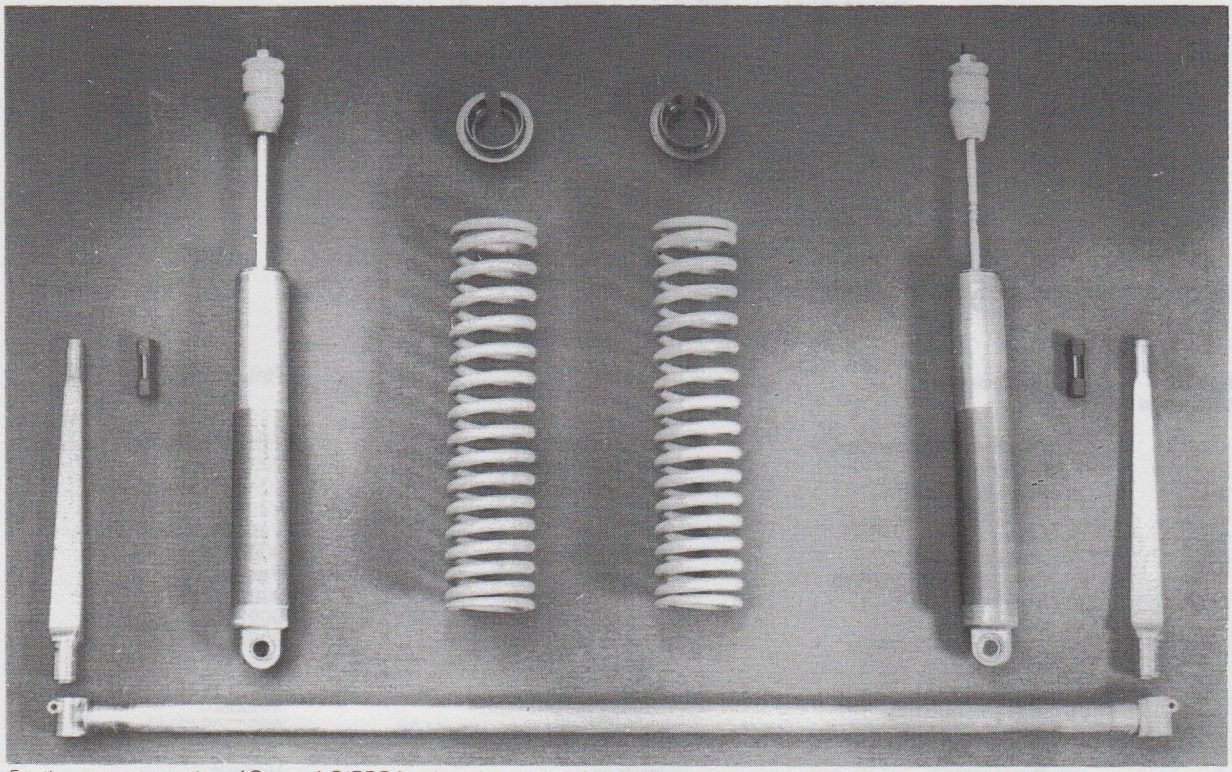
The Group A suspension parts are also compatible with the widest wheels and tyres authorised by regulation for use on SIERRA models, and with the largest braking systems (see **Brakes**).

This section should be studied and cross-referred, to the 'setting-up' chassis specifications provided elsewhere in this Preparation Guide.

A range of different rate springs, dampers and anti-roll bars have been developed. These cover tarmac and loose-surface events for racing and rallying. No change or modification has to be made to the body/chassis structure, or to the cross-member, to fit any of the specially-developed Group A rear suspension parts. However, in preparation for fitting the adjustable anti-roll bar, which is positioned behind the line of the final-drive casing and below the spare wheel well pressing, it is necessary to bolt up the mounting brackets to the chassis rail. These should be placed so that the centre line of the anti-roll bar is 14.85cm/5.85in. behind the line of the two **rearward** mounting holes (in the body shell) for the standard final drive casing. To ensure the ideal geometry of the anti-roll bar linkage, the nominal length of the anti-roll bar drop link should be 11.5 cm/4.5 in.

Parts Available:

A full range of different rate springs (linear rate and progressive rate), dampers, and anti-roll bars is available, to suit all kinds of usage. As with front suspension, the rear suspension uses combined spring/damper units, the dampers having adjustable spring seat heights, so as to suit the different length springs in the lists.



For the rear suspension of Group A SIERRAs, there is a range of springs, dampers, and anti-roll bars, to allow the car to be set up high or low, soft or firm, for loose-surface or tarmac rallies.

Available Springs:

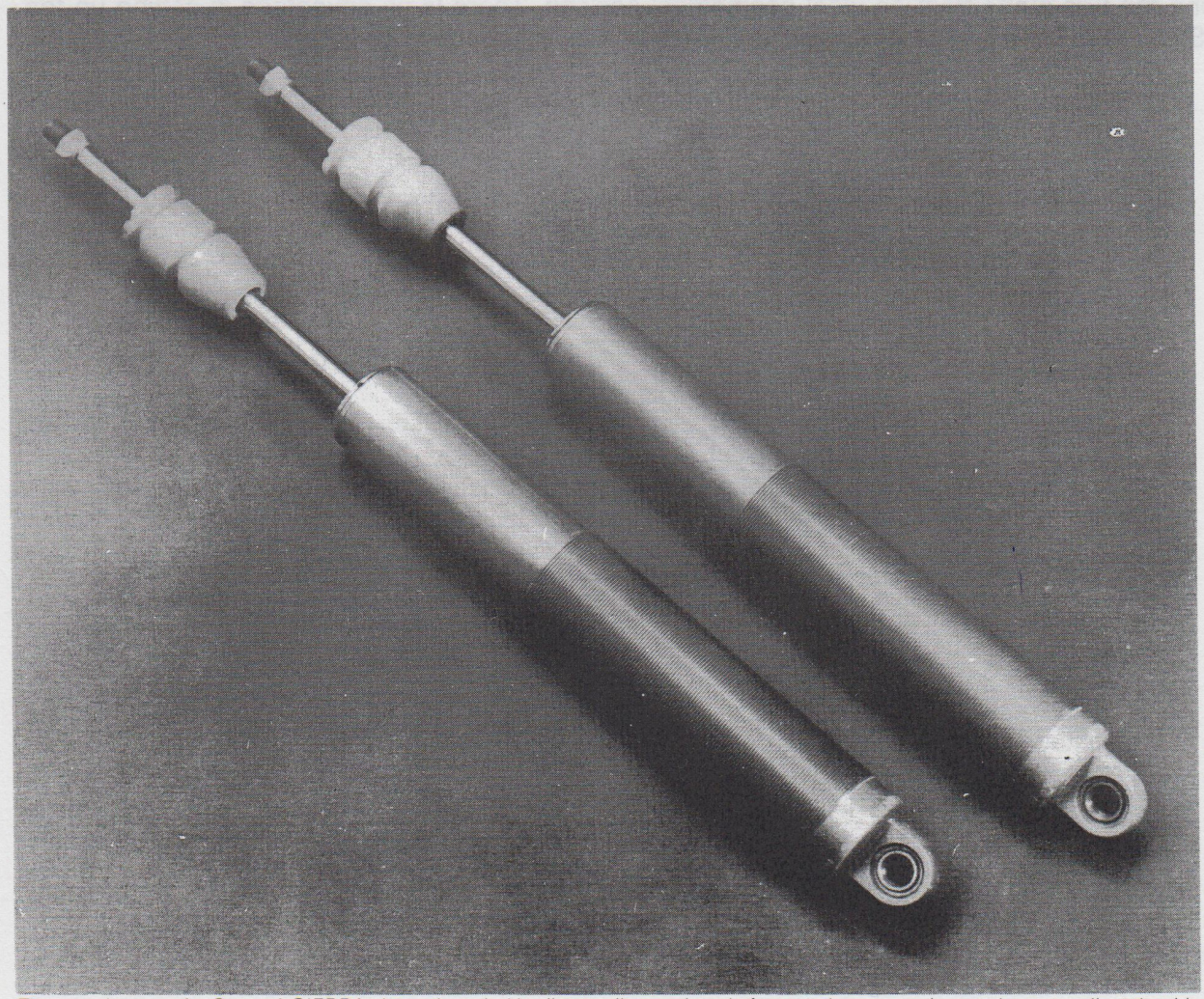
Tarmac Events	Gravel Tracks	Comments
36 N/mm/355 mm long		
38 N/mm/355 mm		This spring was successfully used on the 1000 Lakes rally, which was not a tarmac event.
40 N/mm/355 mm	22-31-50 25-34-55	Both these springs have been used successfully on events like the San Remo (gravel sections), and Lombard-RAC rallies.

Available Springs (cont):

Tarmac Events	Gravel Tracks	Comments
40 N/mm/355 mm		
	27-37-61	This is a good all-purpose gravel/loose-stage spring.
	30-35-72	
	33-40-80/440 mm	This spring gives an increased rear ride height and was specifically developed for rough events like the Safari.

Dampers Available:

Tarmac Events	Gravel Tracks	Comments
260/90		
	230/80	
	260/90	This is a versatile rear damper, used on events like the 1000 Lakes and the Lombard-RAC rallies.



The rear dampers for Group A SIERRAs have threaded bodies to allow spring platforms to be screwed up or down, to adjust the ride height of the car.

Anti-Roll Bars Available:

Tarmac Events	Gravel Tracks	Comments
5/8 in. diameter × 14 SWG		
5/8 in. diameter, solid		
1.0in. × 14 SWG		
	5/8 in. × 14 SWG	On gravel, the SIERRA rear suspension develops most grip with the softest possible anti-roll bar. This is usually run in the 'full soft' position, and is sometimes disconnected, or completely removed.

Note: As detailed in the Front Suspension section, the anti-roll bar links can be adjusted from 'full stiff' to 'full soft'.

The rear-end ride height, quoted in the 'Setting-up' Chassis Specifications, should be measured from the chassis bracket/body shell 'pad' adjacent to the outer edge of the cross-member, to the ground. The best balance between ride height, traction and rear wheel camber occurs when the static laden camber of the rear wheels is 0 deg - i.e. the wheels are precisely vertical. This applies whether 16in. or even smaller road wheels/tyres are used. It means that under acceleration the car squats down slightly and gives the best possible rear tyre grip, and in normal conditions of cornering the tyre starts from an ideal geometrical position. There is no advantage in setting up the SIERRA to have permanent negative camber in the static laden position.