

## BRAKES

Both the SIERRA XR4 × 4 and the SIERRA RS/RS500 COSWORTH models have front and rear disc brakes as standard.

On Group N cars, the standard installation must be retained, although the pad materials, and the brake fluid itself, may be changed. The servo, and the ABS, may be disconnected, if required.

On Group A cars, a complete change of system is authorised, if alternative parts are described and illustrated in the homologation form. Alternative installations are available for the SIERRA XR4 × 4 and the SIERRA RS/RS500 COSWORTH models. Also available are dual master cylinder/balance bar kits (to replace the standard systems) and handbrake kits offering hydraulic actuation.

### Group N cars:

Tests and actual competition experience, show that it is not necessary to change the standard brake fluid, which performs satisfactorily in competition conditions. Alternative competition-type brake fluid, however, is available from the specialist brake manufacturers.

A selection of different brake pad materials is available, to suit any SIERRA model and any climatic conditions.

Homologation regulations now allow ABS (Anti-Lock Braking Systems) to be disconnected, if the driver prefers to do this. Tests have shown that under certain conditions - notably on rough going where the front wheels often drop into big pot-holes — ABS sensors tend to let off the brakes when the driver is not expecting this to happen. ABS disconnection is achieved, not by altering the hydraulic circuits, but by disconnecting the appropriate electrical leads.

On top of the brake master cylinder reservoir there are two multi-wire connections - one with three wires, the other with two. Permanent disconnection is achieved by breaking one of the **two**-wire connectors. If the wire is rerouted into the cockpit, and the break is achieved by an On-Off switch, this gives the driver the choice of having the ABS in operation, or out of action.

### 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 braking system, the standard brakes should be retained, the ABS system disconnected and the hydraulic piping slightly modified to eliminate the possibility of front-wheel locking.

The ABS hydraulic installation includes a metal casting in which three brake pipes protrude downwards. On all SIERRA RS COSWORTH models this is mounted on the left side of the engine bay. To re-balance the braking effort the following very minor modifications are recommended:

Blank off the front hydraulic connection

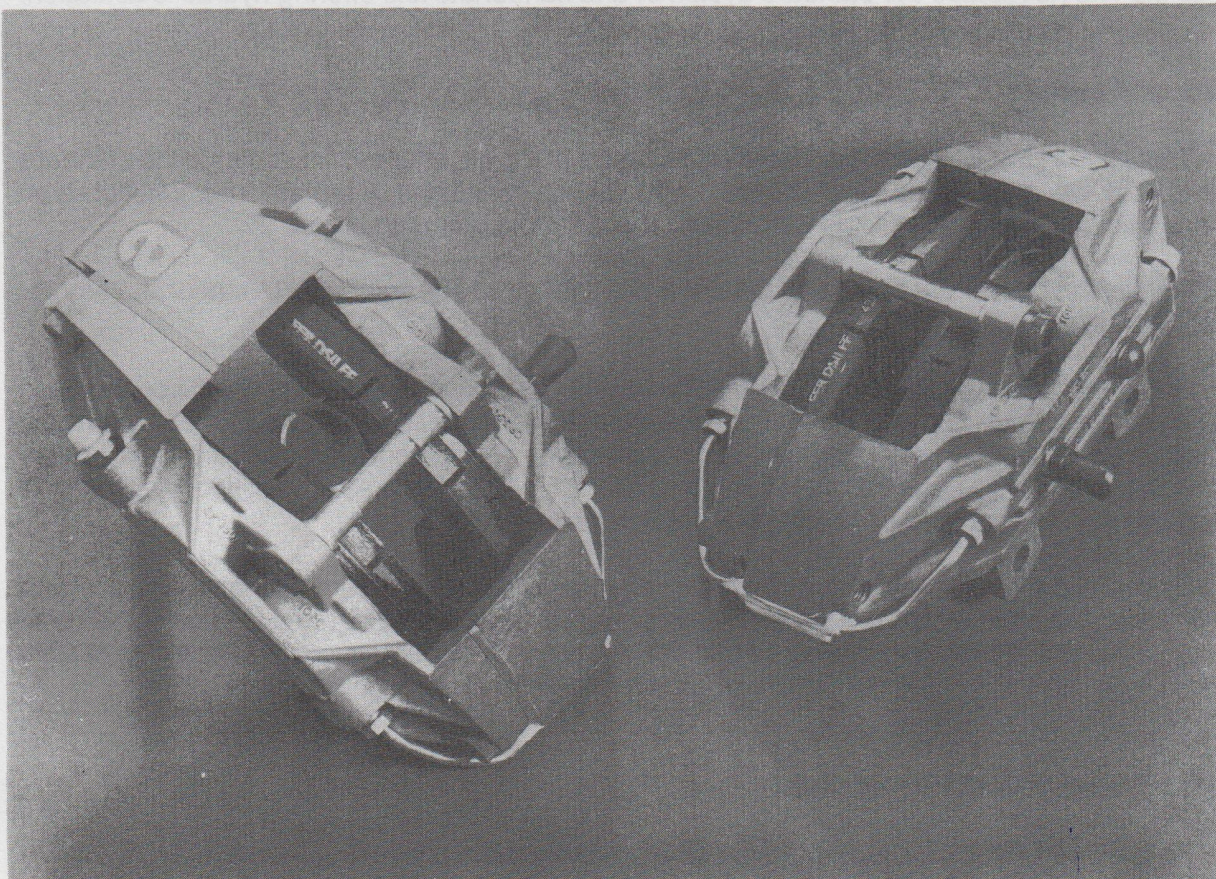
Leave the central hydraulic connection (to the rear wheels) alone, but remove the pressure restrictor from the rear line. It will be used elsewhere.

Modify the piping to the rear hydraulic connection as follows: Mount the brake restrictor valve to the metal casting, then apply the hydraulic tee-piece to this and route brake pipes to each of the front wheels.

This does not provide more powerful braking, but it re-balances and reduces the braking effort on the front wheels, curing the lock-up problem which may occur once the ABS system has been disconnected.

### Group A cars:

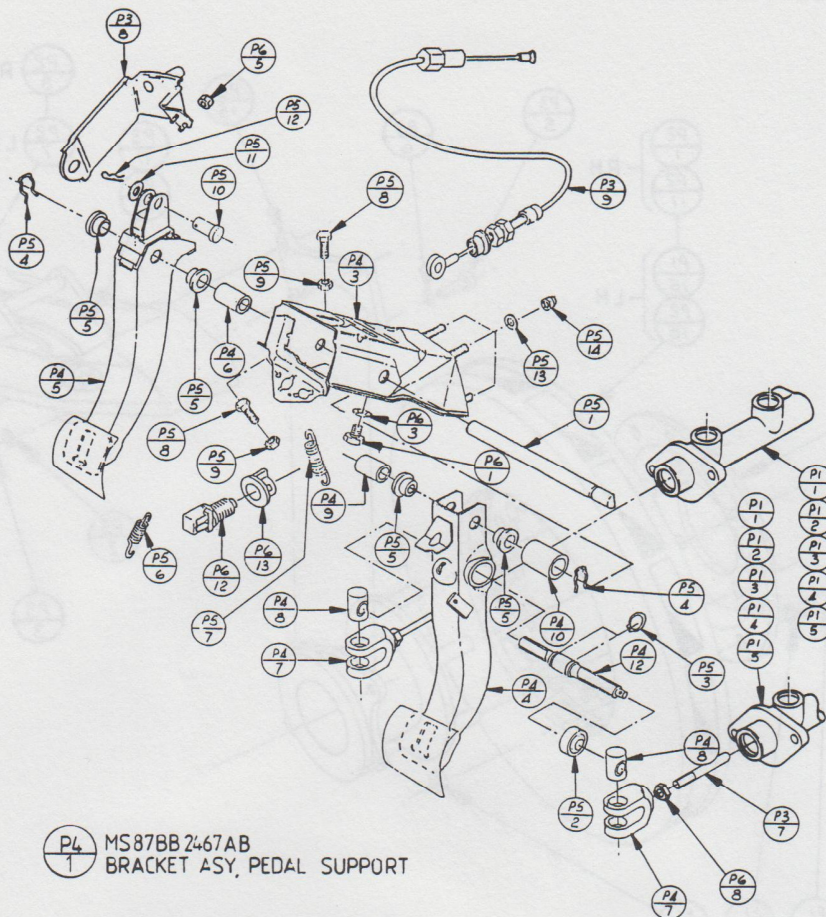
A series of alternative Group A braking kits have been developed, tested and used in all types of motorsport and homologated. In general, there are three different diameters of front disc but the rear discs are all the same diameter. All types of disc are ventilated and all may be fitted to two-wheel-drive SIERRA RS/RS500 COSWORTH models, or to four-wheel-drive SIERRA XR4 X 4 models. For use where local open-road regulations allow, a hydraulic hand-brake kit is also available.



Large four-pot brake calipers are available as part of an integrated braking package, for use in Group A SIERRAs.

In all cases, the design aim has been to provide more powerful ventilated disc brakes at front and rear, which are also more durable and more fade-free than those fitted to standard road cars. Four-pot calipers are specified at front and rear and there is a pedal box with adjustable front/rear brake balance and divided hydraulic circuits which can be tailored to left-hand-drive or right-hand-drive cars.

To allow the customer to set up the braking to his own needs, a range of different diameter brake master cylinders is also available. The system is designed to operate **without** the use of vacuum servo assistance - this is never used on any of the 'works' competition cars.



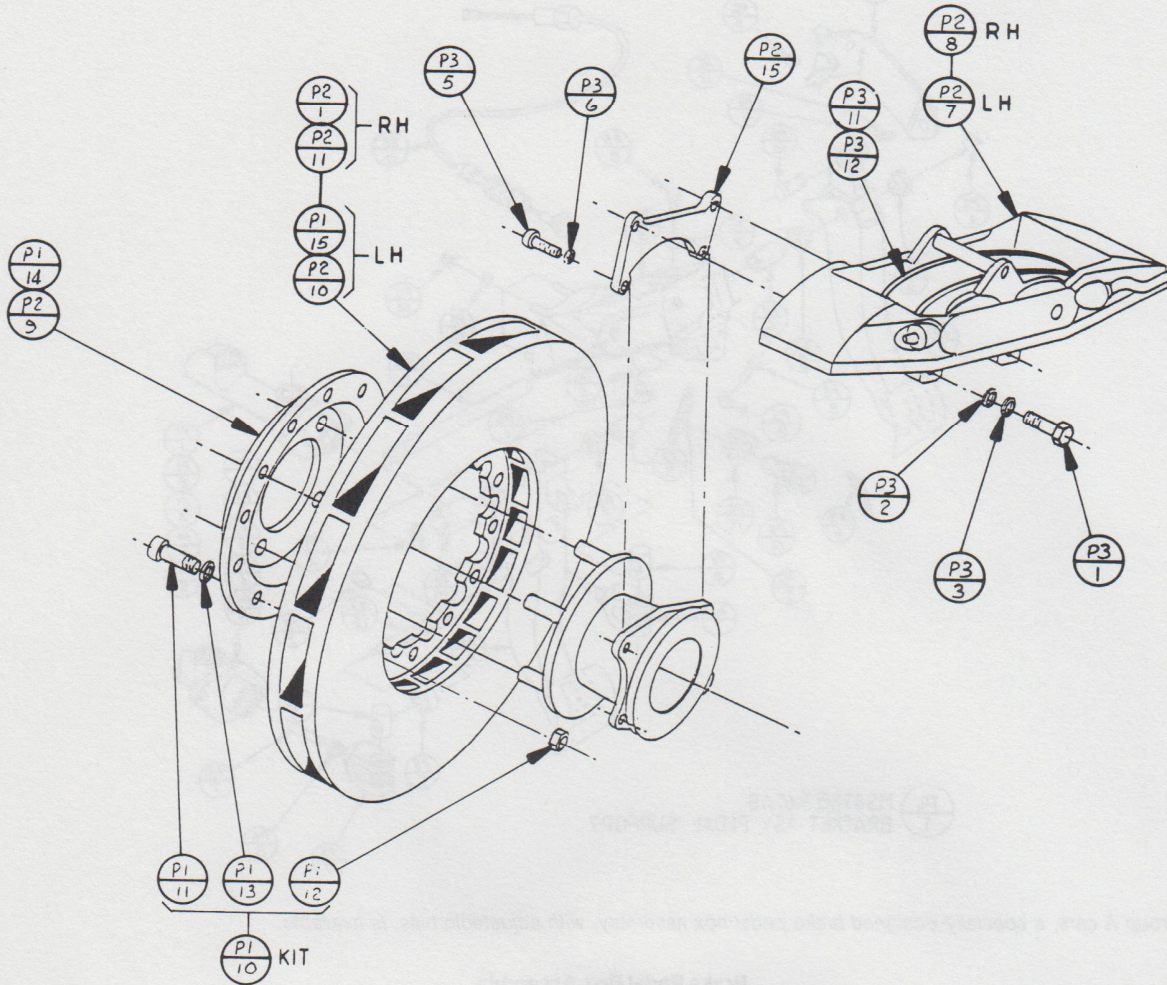
For Group A cars, a specially-designed brake pedal box assembly, with adjustable bias, is available.

### Brake Pedal Box Assembly

Drawing Reference	Component	Part No.	Finis Code
P4/1	Pedal box assembly	MS87BB2467AB	9093130
P1 to P5	Master Cylinders	Various	Various
P3/7	Push rod - master cylinder	MS87BB1727AB	9092896
P3/8	Bracket assembly	MS87BB7L600AA	9092900
P3/9	Clutch release cable assembly	MS88BB7K553CA	9093148
P4/3	Pedal box and extension assembly	MS87BB2457AA	9093136*
P4/4	Brake pedal assembly	MS87BB2455AA	9093133*
P4/5	Clutch pedal assembly	MS87BB7520AA	9093132
P4/6	Clutch pedal spacer	MS87BB7510AA	9093137
P4/7	Brake balancing clevis	MS87BB2461AA	9093320
P4/8	Brake balancing clevis pin	MS87BB2462AA	9093317
P4/9	Spacer	MS87BB2458AA	9093318
P4/10	Spacer	MS87BB2459AA	9093319
P4/12	Brake balance shaft	MS87BB2460AA	9093140*
P5/1	Shaft	83BB7506BB	1621190
P5/2	Spherical bearing	NZS-08	—
P5/3	Circlip	Anderton N1460-0050	—
P5/4	Retainer, spring	—	1583756
P5/5	Bearing bush	—	1591159
P5/6	Clutch pedal retract spring	—	1591622
P5/7	Brake pedal retract spring	—	—
P5/8	Pedal stop screw	E602168S71	1446566
P5/9	Pedal stop locknut	E620012S72	0204716
P5/10	Clevis pin - clutch cable	E840075S71	1527236
P5/11	Washer	E630024S71	1459510
P5/12	Retainer, spring	—	1716165
P5/13	Plain washer	E830111S82	1477027
P5/14	Nyloc Nut	E822018S71	1473038
P6/1	Screw	E602186S72	0240909
P6/3	Flat washer	E630030S71	1488478
P6/5	Nut	E620012S72	0204716
P6/12	Switch assembly	82FB13480AA	1604918
P6/13	Bush	82FB13K452AA	6111455

\* Not serviced separately.

In all cases, the ABS system (which is optional on the SIERRA XR4 × 4, but a standard fitting on SIERRA RS/RS500 COSWORTH models) is removed.



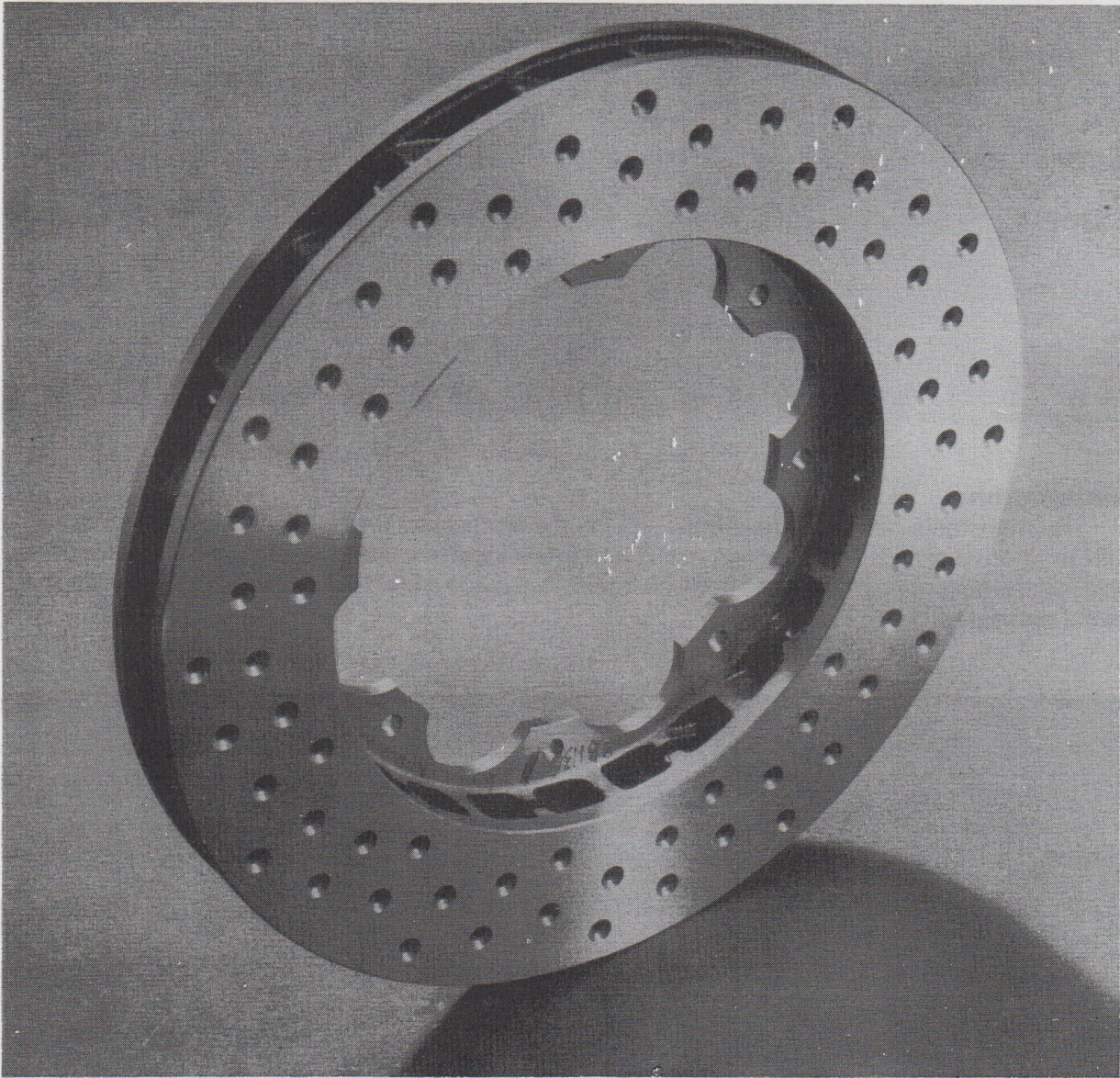
This is the detail of a Group A rear disc brake assembly. The design of the front disc installation is almost identical.

#### Rear Disc Assembly - Cosworth and 4 × 4 models

Drawing Reference	Component	Part No.	Finis Code
P2/1 or P2/11	Brake disc, 285mm, RH	MS87BB1146BA	9092088 (4 × 4)
P1/15 or P2/10	Brake disc, 285mm, LH	MS87BB1146AA	9092087 (4 × 4)
P1/14 or P2/9	Disc Bell	MS87BB1A135AA/BA	9092094/2907 (Cosworth)
P1/10	Kit - bell to disc fixings	MS87BB2001AA	9092107
P2/8	Brake caliper - RH	MS87BB2K371BA	9092104
P2/7	Brake caliper - LH	MS87BB2K371AA	9092103
P3/11 or P3/12	Brake pad, DS11	MS87BB2K021AA	9092315
P3/1	Brake pad, F2459	MS87BB2K021BA	9092325
P3/2	Bolt - M12 × 40	MS180626672	9091918
P3/3	Washer	—	6082617
P2/15	Washer	—	1505544
P3/5	Rear caliper bracket mounting	MS87BB2330AB	9092911
P3/6	Capscrew — M10 × 45	—	—
	Washer	—	1471160

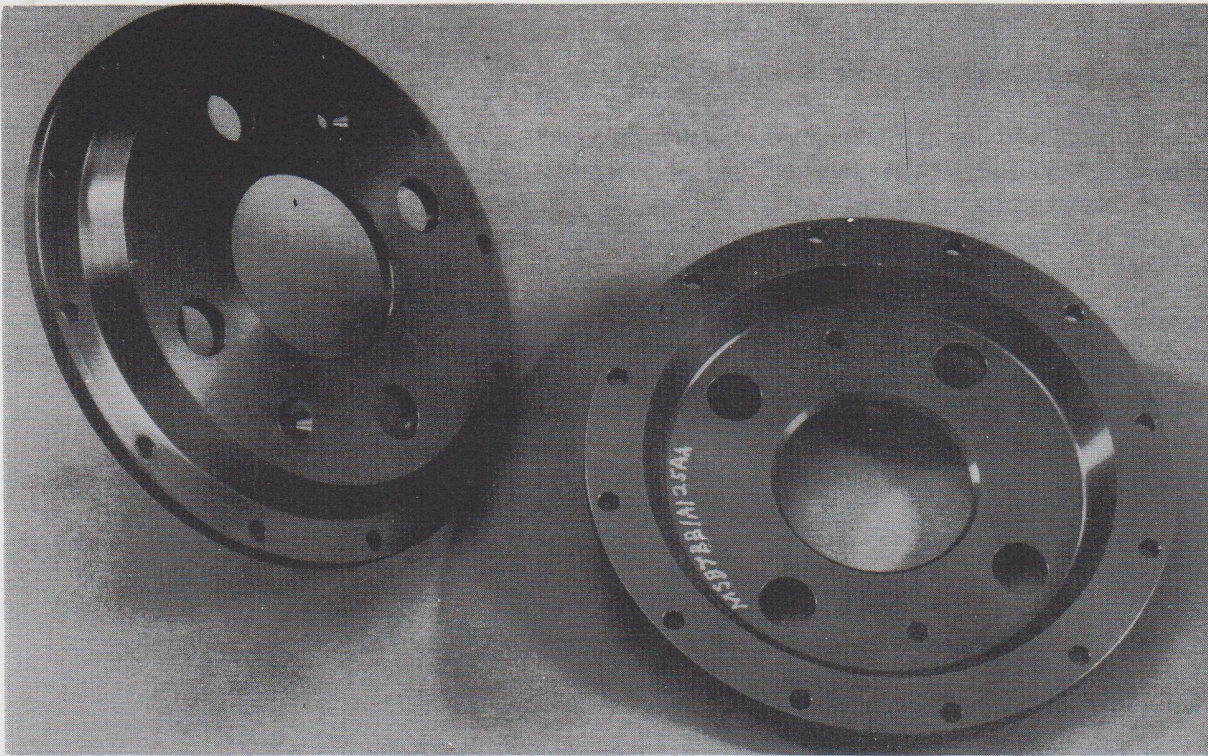
## Brake Disc Diameters and Wheel Sizes:

As already detailed in the sections on **Suspension** and **Wheels**, all design and development work for Group A SIERRA models has been concentrated on the use of 16 in. diameter road wheels. All the braking items marketed by the Motorsport Parts Division can be fitted inside 16 in. wheels, provided that the inside profile of the chosen wheel rims is compatible with the calipers and gives clearance over them.



*This is one of a whole range of different ventilated, cross-drilled, or slotted brake discs which are available for Group A SIERRAs.*

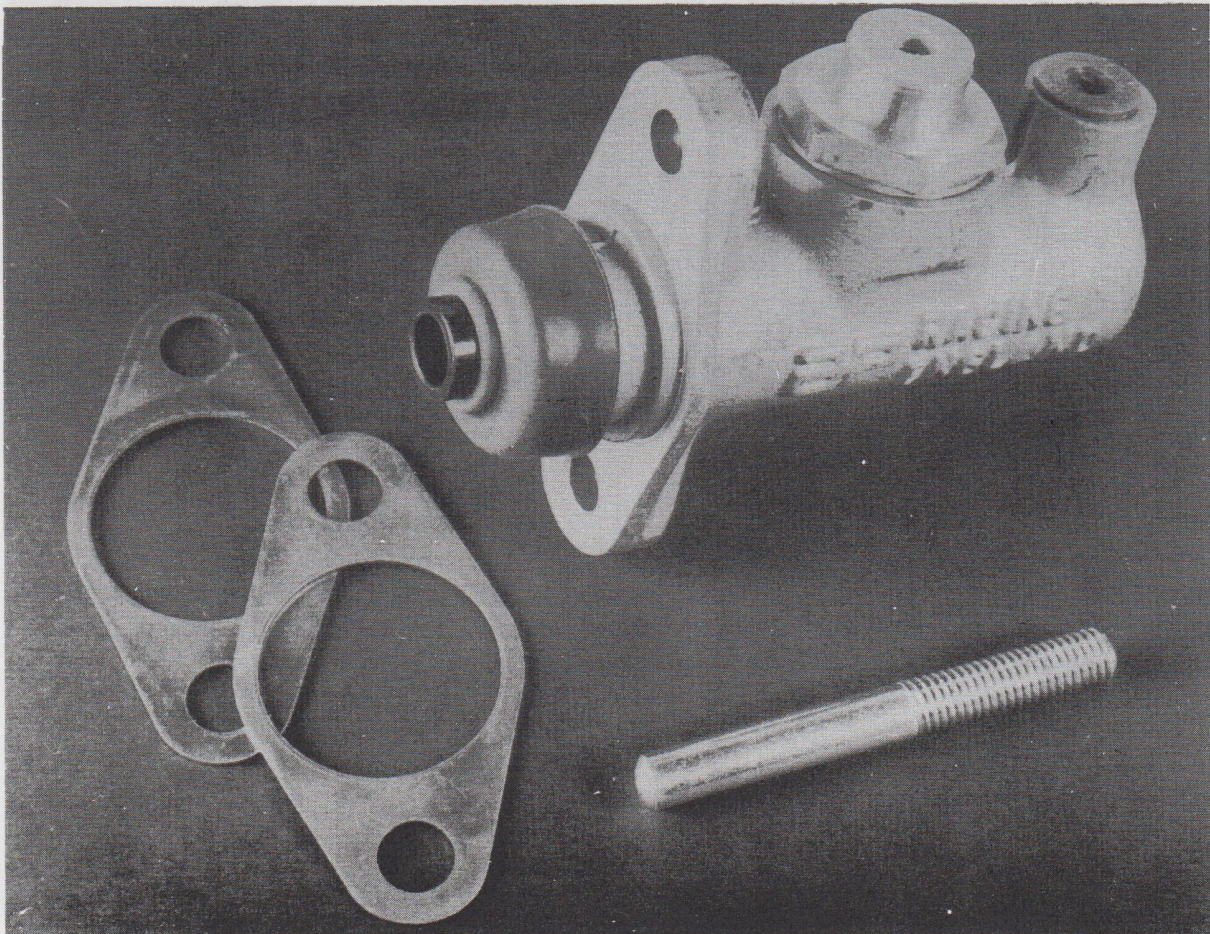
If 15 in. wheels are chosen, neither the homologated 315 mm/12.4 in. front discs nor the 330 mm/13.0 in. front discs can be used. The homologated 285 mm/11.2 in. diameter discs must be used instead. None of the homologated ventilated discs, or their associated calipers, bells and other equipment, fit inside 14 in. road wheels of any type.



*The large Group A brake discs are connected to the hubs by the use of these disc bells.*

**Installation:**

The Adjustable pedal box assembly sold by the Motorsport Parts Division is compatible with left-hand-drive or right-hand-drive cars. Before mounting it to the body structure it is necessary to add a local reinforcing plate to the body bulkhead to provide a stable mounting to withstand heavy pedal pressures.



*When a pedal box kit is fitted, master cylinders of many different bores are available.*

**Experience with the cars, in testing and competition's shows the following disc combinations to be ideal:-**

<b>Model</b>	<b>Front Discs</b>	<b>Rear Discs</b>
<b>SIERRA XR4 × 4</b>		
All conditions	285 mm × 25.4 mm thick (11.2 in. × 1.0in)	285 mm × 25.4 mm thick (11.2 in. × 1.0 in.)

**SIERRA RS COSWORTH**

(Tarmac Events)	315 mm × 32 mm thick (12.4 in. × 1.26 in.)	285 mm × 28 mm thick (11.2 in. × 1.10 in.)
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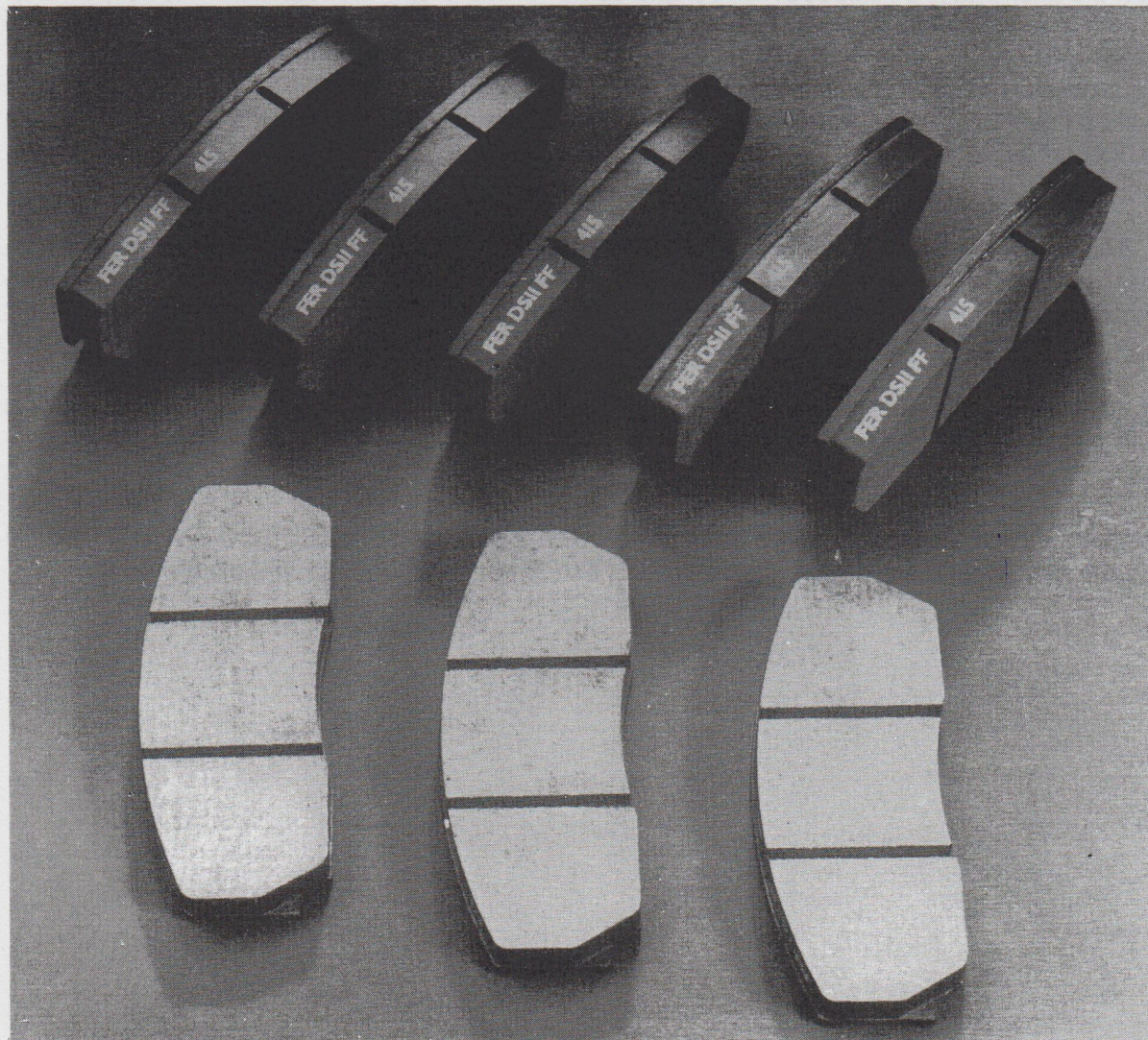
**SIERRA RS COSWORTH**

(Gravel/loose-surface events)	285 mm × 25.4 mm thick (11.2 in. × 1.0 in.)	285 mm × 25.4 mm thick (11.2 in. × 1.0 in.)
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**Master Cylinder**

Diameter for all conditions	0.70 in.	0.75 in., or 0.8125 in.
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— this advice needs to be modified for local conditions. On the Finnish 1000 Lakes rally, for instance, where speeds and temperatures were high, the 'tarmac' brakes were used on a 'loose surface' event.



Disc pad sets in a variety of materials are available for cars fitted with Group A brakes.

**Brake Pads:** The 'works' team has had satisfactory experience with two types of Ferodo pads - Type DS11 and F2459. On balance, the team recommends the use of DS11; if the Type F2459 pad overheats in arduous use, it deposits resin on the discs themselves. This then causes the alarming phenomenon of a good hard 'feel' to the brake pedal, but much reduced braking effect.

An Italian Ferodo brake pad, Type ID346, is also recommended.

### **Brake Cooling Ducts:**

These are strongly recommended for use where a full Group A SIERRA RS COSWORTH/RS500 COSWORTH is to be used where ambient temperatures are high; and where brake usage is expected to be heavy. If such brake ducts (together with appropriately modified spoilers) are fitted, please make sure that these do not come into contact with the road surface when the SIERRA's front suspension is on full bump; and that they do not come into contact with any part of the front suspension, or any of the steering links, at any point in their articulation.

If you decide to make and locate your own braking ducts, remember that you may not open up new vents in the front of the car's bodywork. This advice does not apply to the SIERRA RS/RS500 COSWORTH, where brake cooling holes are already moulded into the front apron; the Motorsport Parts Division cooling ducts are intended to be fixed to these holes.

### **Hydraulic handbrake kit:**

For some types of motor sport, a driver needs the ability to lock-up the rear brakes of his car, to allow the back end to be skidded round a tight corner. A cable-operated handbrake is not powerful enough to achieve this. As an alternative, a 'hydraulic handbrake' kit is now available. This allows the normal handbrake lever to operate through a brake master cylinder mounted on the transmission tunnel which operates on the rear brake calipers through the rear hydraulic circuit. Great care must be taken to ensure complete retraction of the handbrake lever, or else the rear brakes will be left 'locked on'.

**Warning:** In certain countries, the law requires the handbrake to operate on a completely different system from that of the footbrakes. Clearly the hydraulic handbrake kit will not meet such regulations. It is the competitor's responsibility to get a ruling on this **before** he turns up at the start of an event with the hydraulic system fitted.

In the case of the hydraulic kit offered for the SIERRA models; a 0.75 in. brake master cylinder is considered ideal for the purpose; other sizes may, of course, be fitted to the customer's own preference.

**Note:** Such a handbrake kit is more effective on a SIERRA RS/RS500 COSWORTH, where only the rear wheels are driven, than on a SIERRA XR4 X 4 where four wheels are driven.