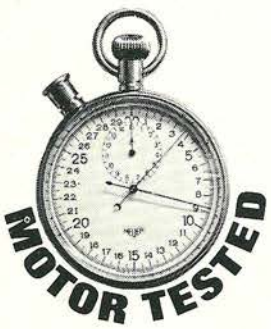
MOTOR ROAD TEST No. 17/68 ● Rover Three Thousand Five

Chrome strip above grille, new badges, fatter tyres and a large air intake below the bumper are the external indications of the bigger engine.



Compact power pack

Outstanding performance with good economy; good handling; Rover virtues unchanged

A WHOLE nation—currently the richest and most powerful on earth—has for more than 30 years been enslaved (automotively speaking) by the large V-8 engine. The muffled syncopation of its beat is as much a part of the American way of life as skyscrapers or the White House. But if in the past Europeans have found this addiction puzzling, regarding it as propulsion by brute force without finesse or subtlety, there are signs that we are about to become converted: several British and Continental manufacturers of luxury or performance cars are on the brink of adopting a V type of engine, while some have already done so. The latest to take this action are Rover, who introduced last October for their bigger cars a 3½-litre light-alloy V-8 developed from the famous GM unit. Now the same company has carried the process one stage further by making this power unit available (with its Borg-Warner automatic transmission) for their 2000 model, thus achieving the classic union between a large (by our standards) American (by parentage) power unit and a sophisticated European chassis. Outwardly, a larger below-bumper air intake, different light-work and overriders, fatter tyres and "V-8 3500" badges at front and rear are the only features which distinguish the car from the 2000, but as our description (pages 66 to 70) shows, the detail differences are numerous.

In almost every way this powerful new Rover combines the best features of Transatlantic and Old World design with none of the drawbacks. Performance, of course, is tremendous: although the maximum speed of 117 m.p.h. recorded on a French autoroute is rather lower than anticipated, the mean 0-60 m.p.h. acceleration time achieved was 9.5s., which puts the car securely in the high-performance sports car bracket. On the long Continental trip which formed part of our test mileage this performance made us masters of the road against all but such ultimate machinery as Maseratis or Ferraris. It also enabled us to cruise at more than 100 m.p.h. for long periods on autoroutes and autostrada and to put 60 miles into each hour when driving on fast French roads in the wet.

The penalty of such exuberance ought surely to be a rapidly emptying tank, but in fact the overall fuel consumption for our mileage abroad (approaching 3,000) worked out at 17.7 m.p.g. of super grade. A combination of more sedate British open-road driving and (rather thirsty) in-town work made little difference—the consumption remains very modest for such a fast car.

But the virtues of the new power unit—in its new home—do not quite end there. Beneath the quiet humming which accompanies the onward surges of acceleration we often became aware of the uneven throb created by the irregular firing intervals from the two banks of cylinders (despite the shared exhaust pipe): when pulling 95 up a long motorway gradient, for example, reflected off the walls of a tunnel, perhaps, or when waffling slowly along a village street. This hint of power underneath the smoothness has its undoubted charm and a day or so of driving the Rover V-8 explains the Transatlantic addiction fully.

One big difference between the Rover and its American counterpart, however, is the great improvement in adhesion provided by a de Dion rear suspension compared to the live axle. Whereas a typical Detroit car with the same power and torque-to-weight ratio will spin its wheels uselessly in the dry, and spend a significant proportion of its journey time trying to go sideways in

PRICE: £1,400 plus £390 19s 5d equals £1,790 19s 5d. Heated backlight £22 5s 4d extra with tax, total as tested £1,813 4s 9d.

Rover 3500 V-8

the wet, the Avon radials fitted to the Rover's rear wheels remained glued to the road under nearly all conditions: provocation on a greasy roundabout was the only thing that could occasionally make the tail break away. Even in Alpine snow, the car retained surprisingly good traction although it naturally became outclassed by the studded or bechained local traffic on the more slippery gradients. Although the car is superbly safe and predictable with a high cornering power, its minor handling deficiencies become more apparent at the higher speeds now possible with the bigger engine. These are mainly a susceptibility to side-winds, a rapid, rather lurching build-up of roll, and excessive understeer when cornering really hard. Nevertheless the Rover remains a have-your-cake-and-eat-it package which is worth every penny of the £1,791 asked.

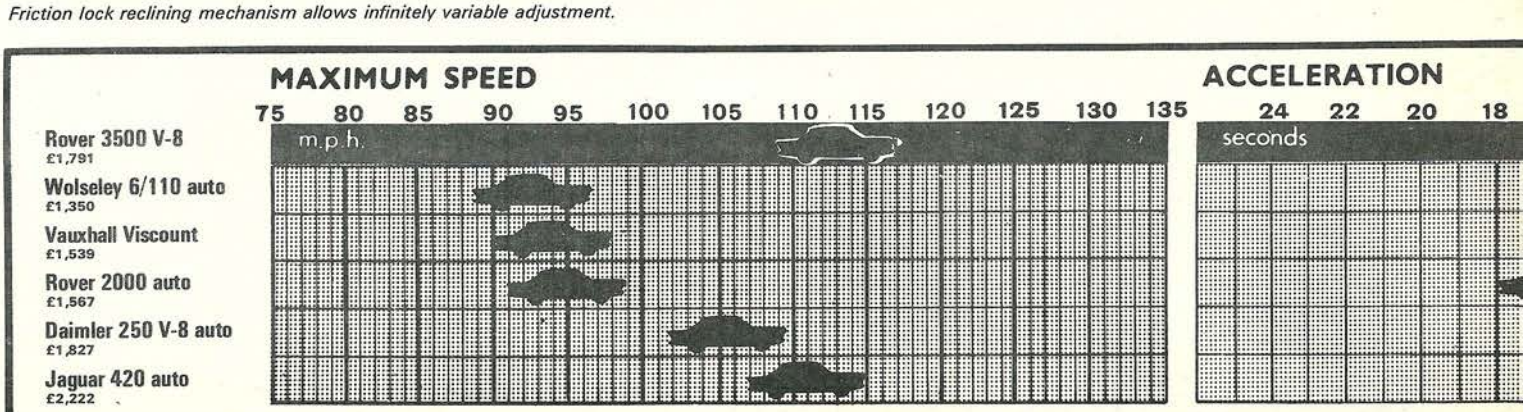
Performance and economy

The manual choke needs to be pulled right out for a prompt cold start and to be kept out for the first mile or two if the engine is to run without hesitation—a warning light tells the driver when it should be returned. Admirably smooth and quiet, though pleasantly less remote than in the bigger car, the V-8 gives deceptively easy performance. Even with the transmission set to its leisurely D2 mode which uses only intermediate and high gear, the V-8 is much faster than the ordinary automatic 2000 is in D1 when accelerating from a standstill up to 60 m.p.h., and not far behind the TC; from 60 onwards it is quicker as the table opposite shows.

But by doing no more than selecting D1, and putting his right foot hard down the V-8 owner can comfortably dust off a TC in any traffic-light drag race, the 3500 being 1.6s. quicker to 60 m.p.h. and nearly 6s. faster to 90. And by using the position to hold low to 50 m.p.h. and intermediate to 80 m.p.h. the superiority is crushing.

But the real benefit of the big engine comes from the improvement in the top gear acceleration, and you have to get away from

Friction lock reclining mechanism allows infinitely variable adjustment.



	Automatic		Manual	TC	3500	
Maximum speed	95.9		104.0	108.4	117.0	
	D1				D2	D1	Manual Hold
Acceleration	Sec.		Sec.	Sec.	Sec.	Sec.	Sec.
0-30	6.9		4.5	3.8	4.9	3.5	3.5
0-40	9.9		7.3	5.8	7.2	5.2	5.1
0-50	14.9		10.1	8.5	9.8	7.4	7.0
0-60	20.8		14.6	11.9	12.5	10.3	9.5
0-70	29.8		20.1	16.5	16.0	13.6	13.1
0-80	45.9		27.1	22.0	21.0	18.8	17.3
0-90	—		38.8	31.2	26.9	25.3	22.9
0-100	—		—	—	35.7	34.3	32.7

Britain's speed-limited shores to experience this properly since on full throttle (and kick-down) the transmission remains in intermediate up to 66 m.p.h. The 70-90 m.p.h. acceleration time, for example, is 11.7s. compared with the 18.1s. of the 2000TC, which means effortless overtaking on Continental motorways. Only in its 117.0 m.p.h. maximum speed was the performance of the Rover a trifle disappointing—using the cube root rule to compare its performance with the standard Rover 2000 and the TC it ought to have managed more than 120 m.p.h. To compensate for this rather academic failure, the fuel consumption is, as already discussed, excellent; as our touring fuel consumption was 21.3 m.p.g., most owners will probably be able to better 20 m.p.g.

Transmission

A standard Borg-Warner Model 35 torque converter/epicyclic gearbox type of automatic transmission is fitted which gives the driver a fair degree of control over his coggery. In D2, the gearbox starts in intermediate which it holds on kick-down to about 66 m.p.h.—we found the more gentle application of power which this model provides useful in the snow. In D1, first is included and held to 42 m.p.h. Those who are concerned with ultimate performance would prefer the transmission to be set for much higher change-up speeds. By selecting L there is an automatic change-down

Performance

Performance tests carried out by *Motor's* staff at the Motor Industry Research Association proving ground, Lindley.

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Conditions

Weather: Cool and dry.
Temperature 44°-48°F.
Barometer 29.75 in. Hg.
Surface: Dry concrete and tarmacadam.
Fuel: Super premium 101 octane (R.M.). 5-star rating.

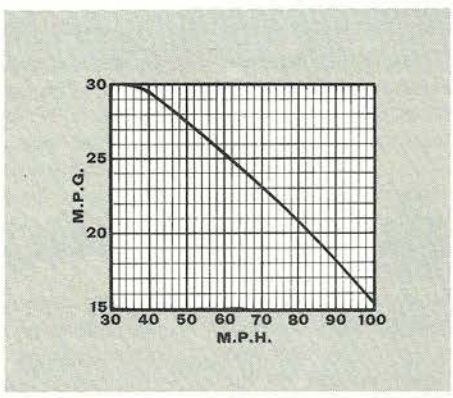
Maximum speeds

	m.p.h.
Mean of opposite runs	117.0
Best one-way kilometre	119.1
2nd gear	80
1st gear	50
"Maximile" speed: (Timed quarter mile after 1 mile accelerating from rest)	
Mean	106.0
Best	108.4

Acceleration times

	D2	D1	Manual hold
m.p.h.	sec.	sec.	sec.
0-30	4.9	3.5	3.5
0-40	7.2	5.2	5.1
0-50	9.8	7.4	7.0
0-60	12.5	10.3	9.5
0-70	16.0	13.6	13.1
0-80	21.0	18.8	17.3
0-90	26.9	25.3	22.9
0-100	35.7	34.3	32.7
Standing quarter mile			17.6

m.p.h.	Kickdown in D1 sec.
10-30	3.5
20-40	3.7
30-50	3.9
40-60	5.1
50-70	6.2
60-80	8.5
70-90	11.7
80-100	15.5



Fuel consumption

Touring (consumption midway between 30 m.p.h. and maximum less 5% allowance for acceleration) . . . . . 21.3 m.p.g.
Overall . . . . . 17.5 m.p.g. (=16.1 litres/100 km.)
Total test figure . . . . . 3,500 miles
Tank capacity (maker's figure) . . . . . 15 gal.

Brakes

Pedal pressure, deceleration and equivalent stopping distance from 30 m.p.h.

lb.	g	ft.
25	0.36	83
50	0.82	36½
60	1.0	30

Fade test

20 stops at ⅓g deceleration at 1 min. intervals from a speed midway between 30 m.p.h. and maximum speed (=73½ m.p.h.)

	lb.
Pedal force at beginning	25
Pedal force at 10th stop	25
Pedal force at 20th stop	30

Steering

Turning circle between kerbs:	ft.
Left	33
Right	33
Turns of steering wheel from lock to lock	4
Steering wheel deflection for 50 ft. diameter circle	1.2 turns

Speedometer

Indicated	10	20	30	40	50	60	70	80	90	100
True	10	20	30	40	49	59	68	78	88	98

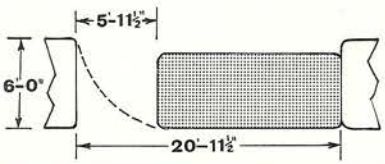
Distance recorder . . . . . accurate

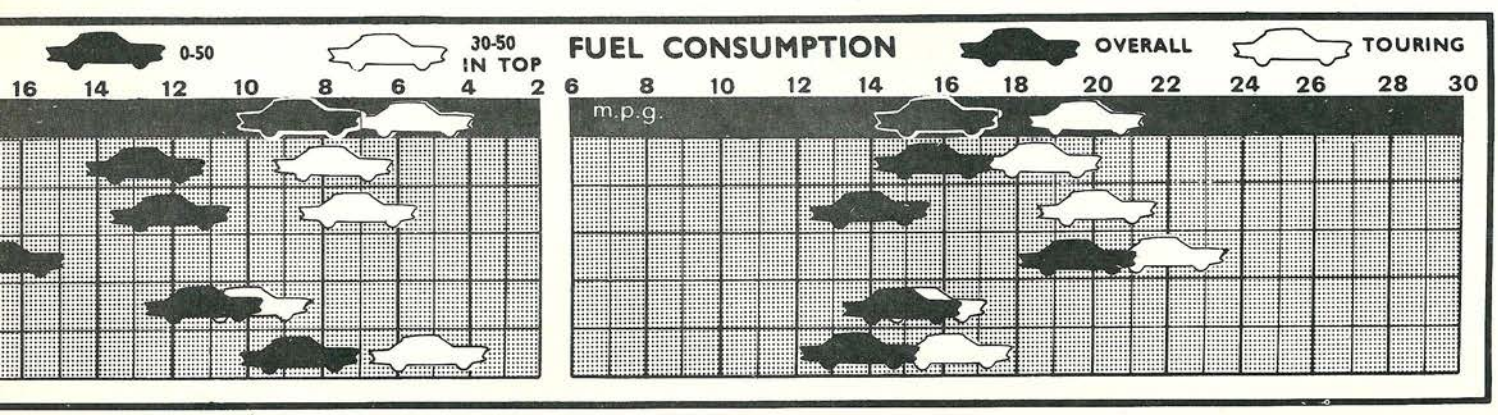
Weight

Kerb weight (unladen with fuel for approximately 50 miles) . . . . . 26 cwt
Front/rear distribution 51/49
Weight laden as tested . . . . . 29.75 cwt.

Parkability

Gap needed to clear a 6ft. wide obstruction parked in front:





Rear seats are specifically designed to take two passengers only, although a child can be seated between them when the arm rest is pushed up.

Front seats have excellent range of adjustment, but the cushion needs to be tilted backwards to obtain proper comfort.

The boot was unusually small for a car of this type, and would only accept 8.5 cu.ft. of our test boxes. The battery is fitted by the offside rear wheel arch—opposite spare wheel—and reduces luggage space very slightly compared to 2000.

Safety check list

Steering assembly	
Steering box position	Very far back on scuttle
Steering column collapsible	No, but column is jointed and will break on impact
Steering wheel boss padded	No
Steering wheel dished	No
Instrument panel	
Projecting switches	Yes
Sharp cowls	No
Padding	At top and bottom of facia and on glove boxes
Windscreen and visibility	
Screen type	Zone toughened
Pillars padded	No
Standard driving mirrors	Interior
Interior mirror framed	Yes
Interior mirror collapsible	No
Sun visors	Crushable
Seats and harness	
Attachment to floor	On slides
Do they tip forward?	No
Head rest attachment points	Yes
Back of front seats	Yes
Safety Harness	Lap and diagonal
Harness anchors at back	Yes
Doors	
Projecting handles	Yes
Anti-burst latches	Yes
Child-proof locks	Yes, at rear

Rover 3500 V-8

to intermediate as soon as the speed falls to about 60 m.p.h. and the gear can then be held until the 80 m.p.h. change-up point marked on the speedometer (corresponding to 4,800 r.p.m.) is reached when the driver must push the lever forward into D1 or D2; similarly if the speed falls below about 20 m.p.h. after Lockup has been selected, the gearbox goes into low and can be held thus until the 50 m.p.h. change-up mark has been attained.

Automatic changes were only moderately smooth—not as good as are achieved by the best American installations. Kick-down always engaged after about a second's delay and with a violent thump, but the box dropped smoothly and progressively down into intermediate when L was used.

Handling and brakes

With a very high cornering power, strong (and final) understeer and considerable roll the Rover has a limit which is not easily reached in the dry and rarely overstepped in the wet. It takes a good deal of effort to provoke a thin howl of protest from the Avon radials (185-14 size on 5½-in. rims instead of 165-14 on 5-in. rims on the standard 2000) which gave outstanding adhesion on a wide variety of surfaces. Bumps and holes in the road surface are felt through the steering—which is slightly lower-geared than in the 2000—but do not put the car off its chosen path.

But these virtues do not entirely compensate for a certain discomfort when driving fast. The considerable understeer means that a good deal of lock is frequently necessary, especially in the sort of 180 degree *tornante* mountain hairpin which calls for an additional armful when it suddenly tightens up. On a succession of the very fast bends to be found on French main roads or Italian mountain-traversing autostrada the rapid initial build up of roll led to a series of unpleasant lurches as one curve was left behind and the car lined up for the next.

As originally supplied, the car (which was a pre-production model) had two faults in its steering: excessive friction in the steering box and an error in its vertical position. The first accentuated a tendency to wander on the straight and the second caused bump and camber steering; there was a marked sensitivity to sidewinds, particularly at high speeds. After these faults—which we have encountered in other examples of the 2000 breed—were cured by the factory, there was a great improvement in the lightness and precision of the steering and a great improvement in high

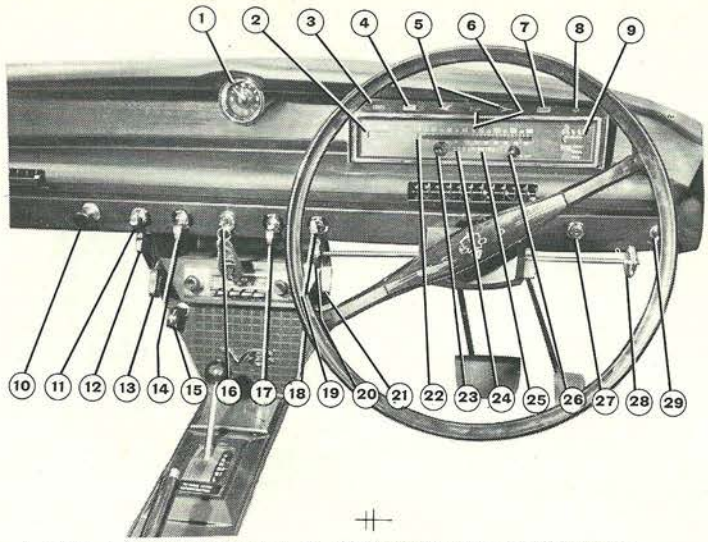
speed stability so that one was no longer conscious of having to hold the car on a straight course.

Although the brakes (slightly enlarged for the 3500) showed an exemplary freedom from fade—both during our tests and on real mountain descents—and sent the dial of our Tapley meter off the end of its scale to record a maximum retardation of more than 1g, they proved to be rather spongy with a slightly unprogressive action, and they made a loud grating noise when used hard. This unprogressive characteristic, together with a good deal of nose-dive during braking, called for concentration to achieve smooth stops in traffic. But the brakes were unaffected by a thorough soaking in the MIRA watersplash, and the handbrake produced a good 0.37g stop although it would only just hold the car on a 1-in-3 slope.

Comfort and controls

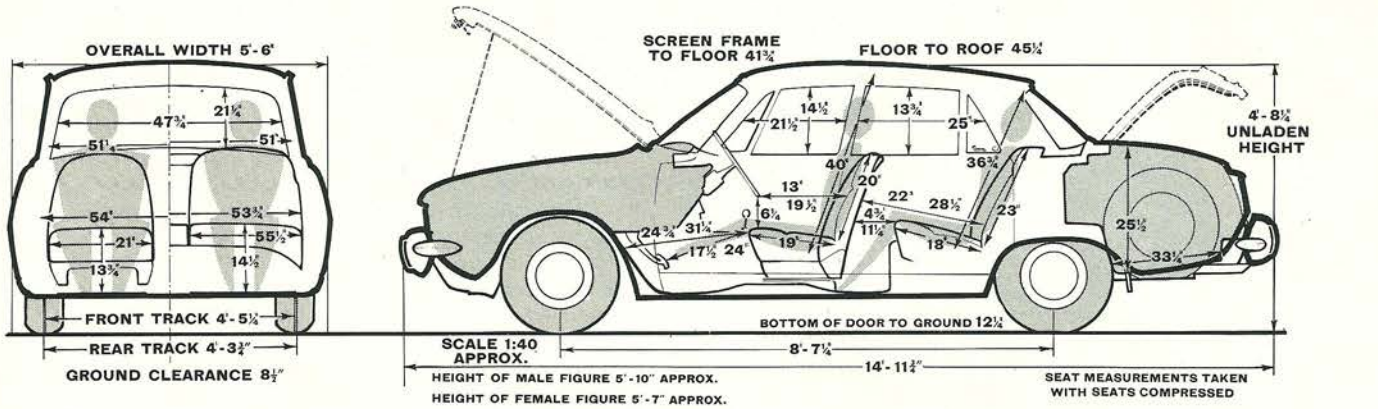
The Rover 2000 has acquired a most enviable reputation as one of the best sprung cars on the market and the 3500, of course, differs in no important way. It is notably free of pitch, such bounce movement as remains is slow and heavily damped and this is one of the very few cars which gives as good a ride in the back seats as in the front. There is no float on long undulations and the car is equally—but modestly—disturbed by sharper irregularities.

Most of our test staff complained bitterly about the lack of lumbar support in the front seats—or the presence of it in the wrong place—and the general design which caused the occupants to slide forward, but from experience with out staff 2000 we know that these faults can be completely eliminated by tilting the whole



1, clock. 2, temperature gauge. 3, choke warning light. 4, oil pressure warming light. 5, indicator tell-tales. 6, main beam warning light. 7, brake warning light. 8, ignition warning light. 9, fuel gauge. 10, cigar lighter. 11, interior light switch. 12, heater air distribution. 13, heater volume. 14, park/side switch. 15, petrol reserve tap. 16, ignition/starter lock. 17, fog/head switch. 18, choke. 19, wiper/washer switch. 20, headlamp/flasher stalk. 21, air volume control. 22, speedometer. 23, trip mileometer reset. 24, trip mileometer. 25, mileometer. 26, panel rheostat. 27, glove compartment lock. 28, indicator/horn stalk. 29, backlight heater switch.

Specification



Engine

Cylinders	8 in V
Bore and stroke	88.9mm x 71.12 mm.
Cubic capacity	3,528 c.c.
Valves	Pushrod o.h.v.
Compression ratio	10.5:1
Carburetter(s)	Two SU HS6
Fuel pump	AC mechanical
Oil filter	Full-flow
Max. power (gross)	184 b.h.p. at 5,200 r.p.m.
Max. torque (gross)	226 lb.ft. at 3,000 r.p.m.

Transmission

Borg-Warner Type 35 automatic gearbox

Top gear	1.0:1
2nd gear	1.45:1
1st gear	2.39:1
Reverse	2.09:1
Final drive	3.08:1
M.p.h. at 1,000 r.p.m. in:—	
Top gear	24.1
2nd gear	16.6
1st gear	10.1

Chassis

Construction	Unitary

Brakes

Type	Servo-assisted discs
Dimensions	Front, 10.82in. dia; rear 10.69 in. dia.
Friction areas:	
Front:	26.9 sq. in. of lining operating on 220 sq. in. rubbed area of disc
Rear:	14.0 sq. in. of lining operating on 152 sq. in. rubbed area of disc

Suspension and steering

Front	Independent with coil springs, longitudinal top links and transverse bottom links
Rear	Coil springs and de Dion tube located by Watt linkages
Shock absorbers:	
Front: } Rear: }	Woodromatic telescopic
Steering gear	Burman recirculating ball
Tyres	1856 x HR14 Avon radials
Rim size	5½J incorporating safety ledge.

Coachwork and equipment

Starting handle	No
Jack	Screw
Jacking points	Two each side under sills
Battery	12 volt negative earth 60 amp. hrs capacity
Number of electrical fuses	4
Indicators	Self-cancelling flashers
Screen wipers	Variable speed, self-parking
Screen washers	Trico electric
Sun visors	Two
Locks:	
With ignition key	Front doors
With other key	Boot lid, petrol filler cap and glove box
Interior heater	4½ Kw. fresh-air.
Extras	Headrests, rear seat headrests, heated backlight laminated screen, spare wheel carrier for boot lid, etc.
Upholstery	Leather
Floor covering	Carpet
Alternative body styles	None

Maintenance

Sump	9 pints SAE 10W30
Gearbox	14 pints SAE AQ/ATF type A
Rear axle	2¼ pints SAE 90 EP
Steering gear	SAE 90 EP
Cooling system	15¼ pints (3 drain taps)
Chassis lubrication	Every 5,000 miles to 2 points
Minimum service interval	5,000 miles
Ignition timing	6° b.t.d.c.
Contact breaker gap	0.014-0.016 in.
Sparking plug gap	0.25 in.
Sparking plug type	Champion L87Y or AC43F5
Tappet clearances	Self-adjusting hydraulic tappets
Valve timing:	
inlet opens	30° b.t.d.c.
inlet closes	75° a.b.d.c.
Exhaust opens	68° b.b.d.c.
exhaust closes	37° a.t.d.c.
Front wheel toe-in	$\frac{1}{8} \pm \frac{1}{16}$ in.
Camber angle	0° ± 1°
Castor angle	1½° ± ½°
King pin inclination	8°

Tyre pressures: lb/sq.in.

	Normal	Fully laden
Front	28	30
Rear	30	34

Reprinted from MOTOR week ending April 20 1968 issue

From the rear, only the badges on the bootlid distinguish the new car from a 2000.

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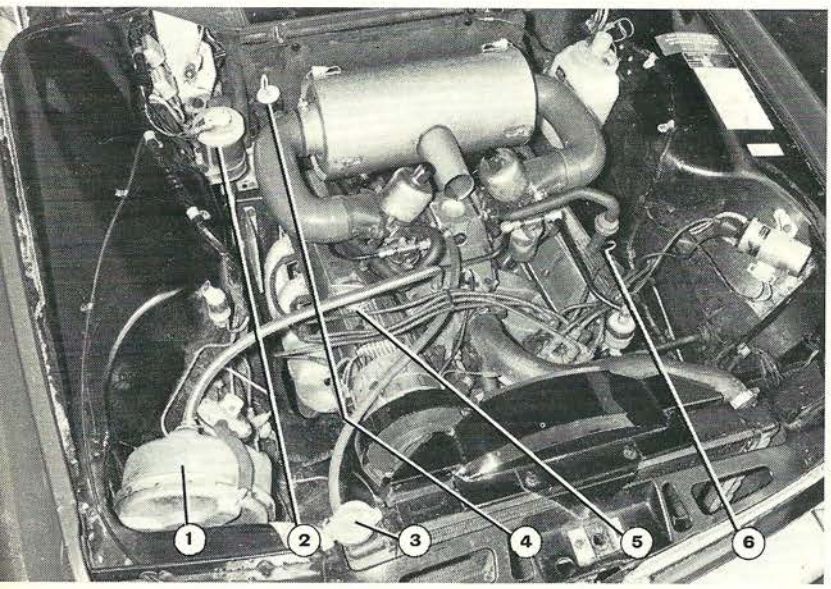
seat back about 10° by using the longer bolts and distance-pieces available.

The Rover is one of the all-too-few cars with a proper range of fore-and-after adjustment: a man 7 ft. tall should have no difficulty in driving in comfort—at any rate our 6 ft. 4 in. staff member expressed himself as having ample legroom. The backrests are reclinable, too, by an admirable infinitely variable friction lock arrangement which is fine so long as you remember to push the locking lever down hard enough. There is rake adjustability in the steering column and all the major controls are well located. It is uncomfortable, however, to be obliged to rest the left foot on a flat surface and an angled footrest would be a useful fitment.

Minor controls are also generally well arranged in the famous Rover 2000 ergonomic system with a flasher/headlamp control stalk on the left and an indicator/horn stalk on the right, giving a system which requires a little learning but has the advantage that when you instinctively "pull everything" you sound the horn and flash the headlamps. But we can see no sense in having a separate facia "park/side" and "fog/head" switches. True, the head and sidelamp switches are wired in series so that you can get the headlamps just by operating the sidelamp switch, when you have previously closed the headlamp switch, but then why have two switches? And what if you want the foglamps *and* the headlamps?



1, brake servo. 2, brake fluid reservoir. 3, radiator filler cap. 4, automatic transmission dipstick. 5, oil filler cap. 6, dipstick.

MAKE: Rover. MODEL: Three Thousand Five. MAKERS: The Rover Company Ltd., Lode Lane, Solihull, Warks.

Despite the absence of the fashionable extractor vents the Rover's heating and ventilating system is superb. With controls for temperature and distribution of heated air, and a separate lever for air volume (which also governs the flow to the fresh air vents) it is easy to control. The powerful but not unduly noisy blower cleared a heavily misted screen in a matter of seconds, and the fresh air vents with their individual flaps and levers allow the ideal combination of warm feet and legs with a cool breeze over the face.

So rapid have been recent advances in body design that the Rover seems almost old-fashioned in some respects. There is the clutter—from a visibility point of view—of front quarterlights, rather thick and not ideally placed pillars, a somewhat shallow screen and the inability to see the corners of the boot from the driver's seat when reversing. On the other hand the four headlamp system—which was set to a compromise between the British and European systems for our trip abroad—gave excellent illumination both when dipped and on main beam. And of course the system lends itself to even further improvement through the use of quartz-iodine bulbs.

If the engine seldom made itself apparent by more than a discreet humming, the same reticence cannot be attributed to the other sources of noise. On almost all road surfaces abroad—and many at home as well—there was a good deal of humming and singing from the tyres plus rumblings on rough patches. And wind noise built up rapidly above about 60 m.p.h. so that it is difficult to listen in comfort to music from the radio at the 100 m.p.h. of which the car is easily capable.

Fittings and furniture

There is much to be said for Rover's recognition of the fact that facias are essentially rectangular while instruments need not be round. This approach results in a neat instrument cluster with choke, oil pressure, main beam and charge warning lights in which a ribbon speedometer is flanked by fuel and temperature gauges. Such compactness leaves room for a full length parcel shelf along the top of the heavily padded facia in addition to the well-known glove boxes, the one on the passenger's side continuing to accommodate even more impedimenta, even when, as one of our staff said, ". . . you're quite convinced that it can't possibly close". For those whose neuroses are sublimated by smoking rather than the collection of junk, there is one ashtray on the central console in the front and two others at the back.

Larger luggage is less easily accommodated, because the combination of a rearward cranked de Dion tube and the presence of a spare wheel make the boot unusually small for a car of this kind: the overspill from our accumulation of test gear, suitcase and grips had to be accommodated on the back seat when we took the car to Italy.

Servicing and accessibility

When a large V-8 engine is slotted into the space normally occupied by a moderate-sized four, some straining at the seams is to be expected, but for the 3500 the new power unit fits in with room to spare and all the service points are easy to get at. Unlike most V-8s, for example, the air cleaner does not cover the carburetters. Servicing is required every 5,000 miles and involves some engine jobs and checks of the various rubber boots protecting the transmission and suspension. The jack was easy to use. **M**

Insurance

AOA Group rating	5
Lloyd's	5

Maintenance summary

Every 5,000 miles: Change engine oil, replace filter, clean and check sparking plugs, give engine electronic tune-up, check and top up automatic transmission and final drive, check all rubber boots.

Every 10,000 miles: Replace air cleaner elements, replace sparking plugs, check fan belt tension, check de Dion tube and steering box oil levels, check front and rear hubs.

Every 20,000 miles: Drain and refill final drive.