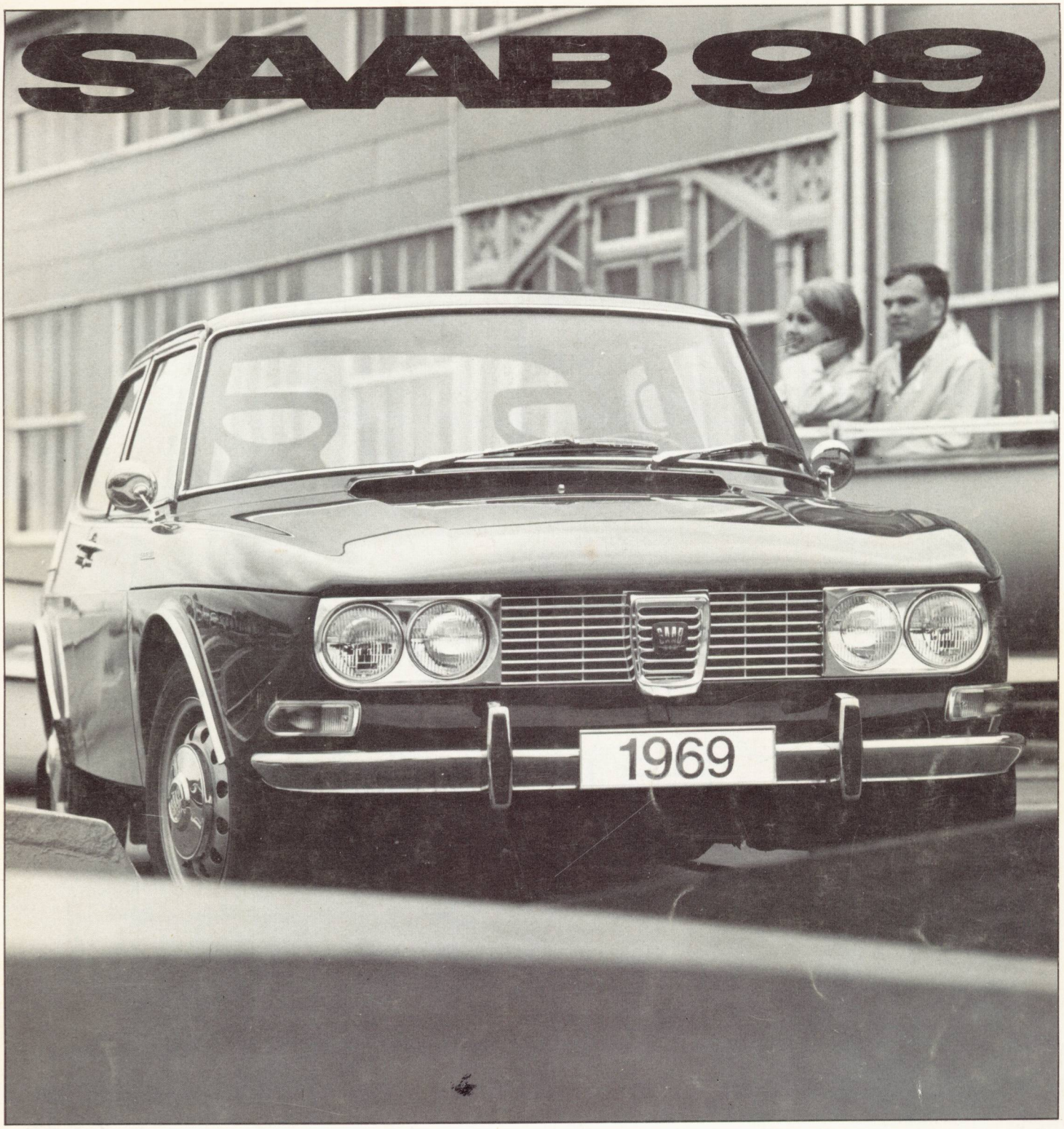
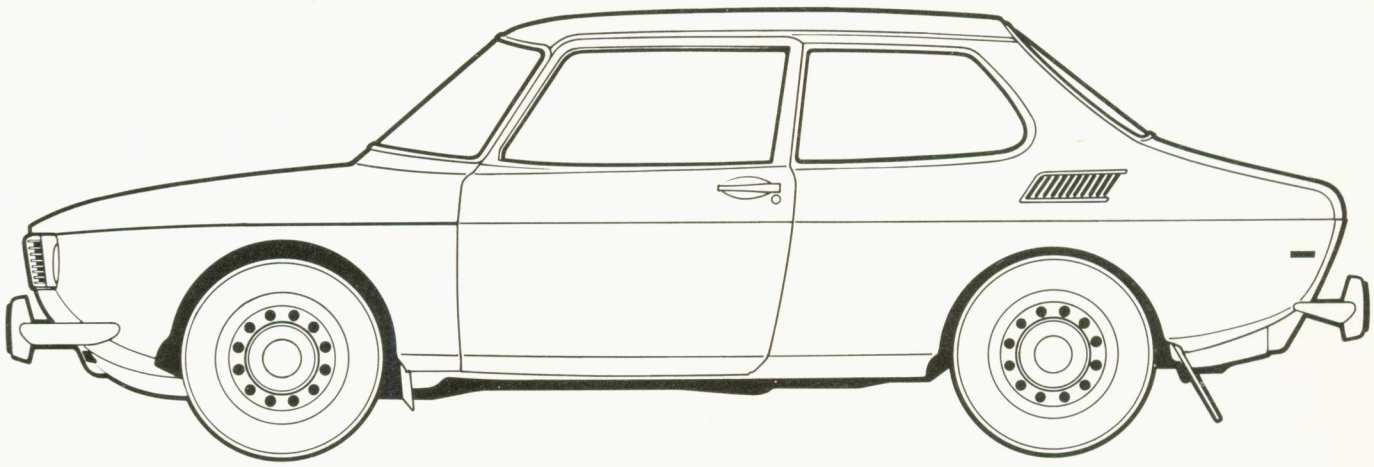
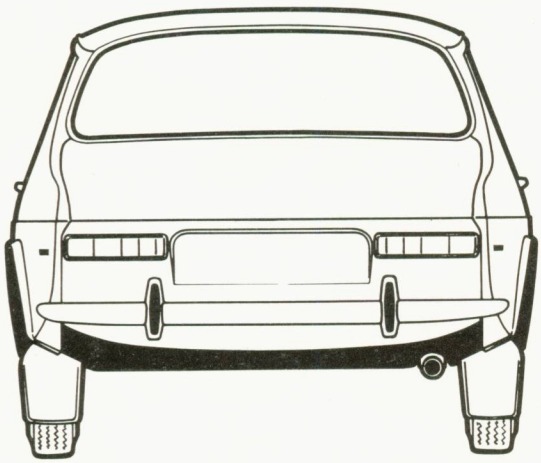
SAAB 99



Engineering features





A NEW CAR

SAAB 99 is the direct result of over ten years automotive research and development and testing. Ten years of complete departure from tradition-bound design thinking. During this period several new concepts in automotive styling and design came to life. After stringent testing and retesting, the best of these concepts were incorporated into the dramatically new SAAB 99.

SAAB has always been in the forefront in the safety field. Its aircraft parentage made even the first SAAB models among the safest on the roads with safety details never before used in automotive design. All of SAAB's safety experience, together with lessons learned in the intensive safety research conducted in recent years, has been taken into consideration in the design of SAAB 99.

Our new 99's styling is a unique combination of design and dimensions. Conceived for the world's growing traffic problems, it was built to be large and roomy on the inside and still compact and easily maneuverable outside.

The overall outside length is short. But, the final measurement was governed by the need for ample room for front and rear passengers, and for ample trunk space. The SAAB 99 is unusually wide, giving it tremendous stability and roadability. It also permits three adults to ride comfortably in the rear seat.

The streamlined design, coupled with a rare coordination of length and width, give the SAAB 99 a sleek continental character all its own. But there's a practical side, too. As a true aerodynamic body configuration, it has the lowest possible air drag to improve handling safety and mileage.

The result of SAAB's decade of research, however, goes deeper than the new 99's body. A new front wheel drive engine has more power, efficiency and dependability than most other power plants its size. And, SAAB's new safety features surpass the motoring requirements of all 30 countries in which it is sold.

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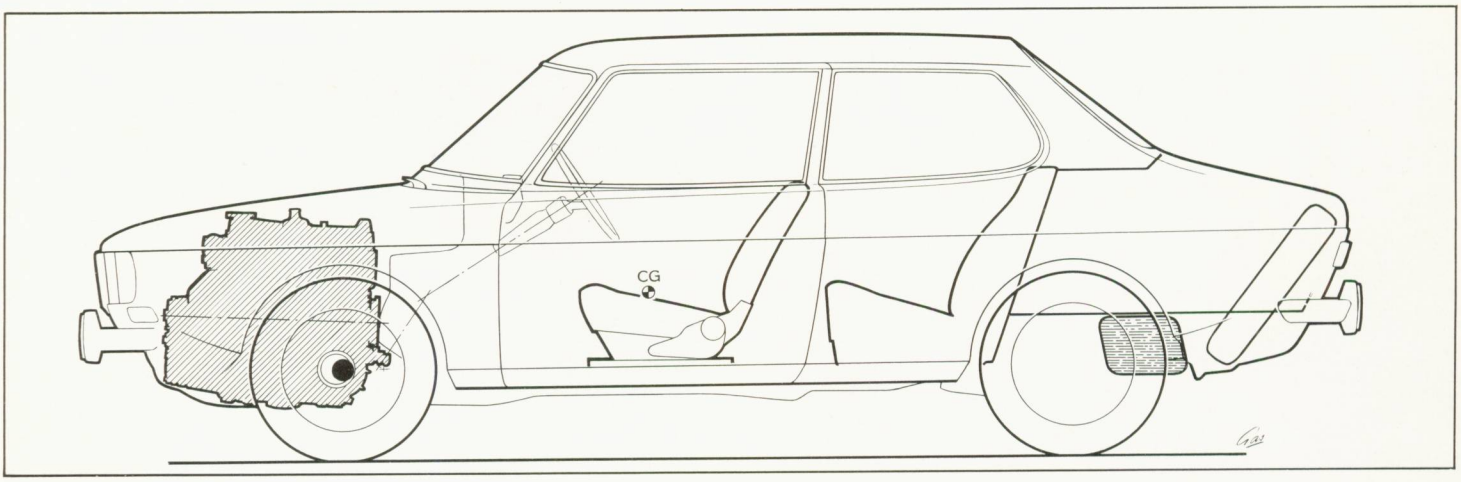

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BASIC DESIGN PRINCIPLES

Of course SAAB 99 has front wheel drive. All SAAB's since the first SAAB was produced in 1950 have had front wheel drive. The engine — with transmission — is still in front, over the drive wheels, for the maximum in stability and roadability. This configuration also allows the best use of the interior space, and it gives the most favourable weight distribution.

The location of the gas tank, between the rear wheels, has been retained for safety reasons.

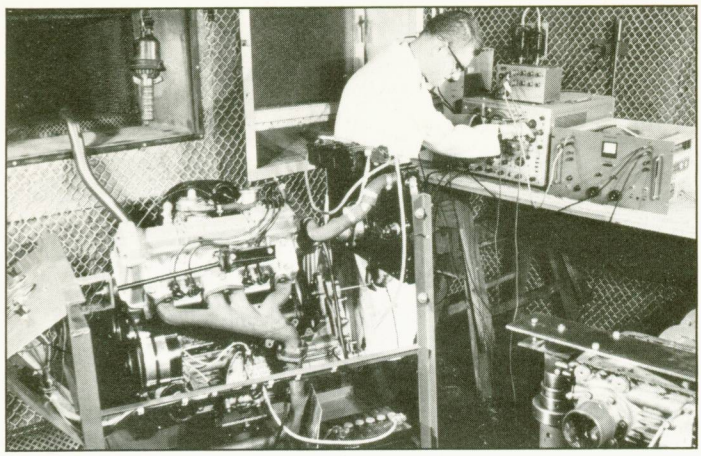
Starting with this proven engineering foundation, the SAAB 99 evolved into a completely new automobile. Larger. Faster, and more luxurious than any SAAB ever built.

The 99 was designed to carry five adults comfortably all day long. Maximum foot, leg, shoulder and head room were among its primary design specifications. As an additional transportation feature, the SAAB 99 quickly changes to a metal floor station wagon with a load capacity of about 30 cu. ft. It's a simple matter of folding door thru back seat.

The 99, like all other SAABs, is designed for dependable motoring in Sweden's rugged nordic winters. The engine, suspension, steering, heating ventilation system and body are all "over-engineered" to fight any automobile's worst enemy, cold weather.

IN SHORT, THIS IS WHAT THE SAAB 99 DESIGN GIVES YOU:

Plenty of room for five persons
Compact exterior
First class riding comfort
Superb heating and ventilation
Outstanding safety
High performance, with good economy
Front wheel drive
Free wheel
Excellent roadholding
15-inch wheels
Wide track
Low center of gravity
Sidewind stability
Low air resistance
Reliable brakes, three independent systems
Good vision
Rear-mounted gas tank
Roomy luggage compartment, convertible rear seat for extra loading space.



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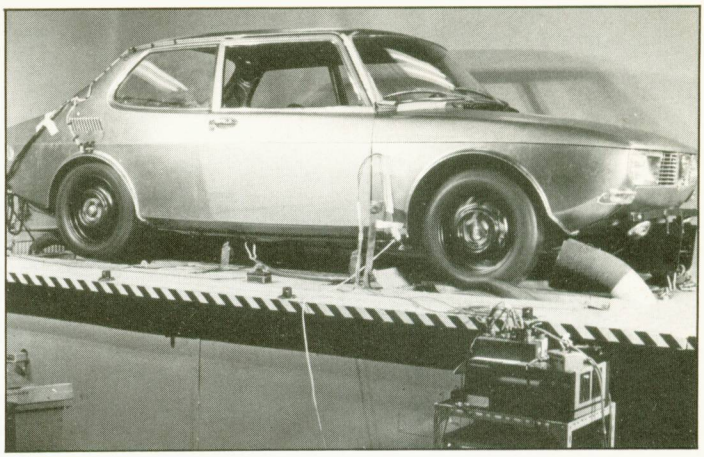

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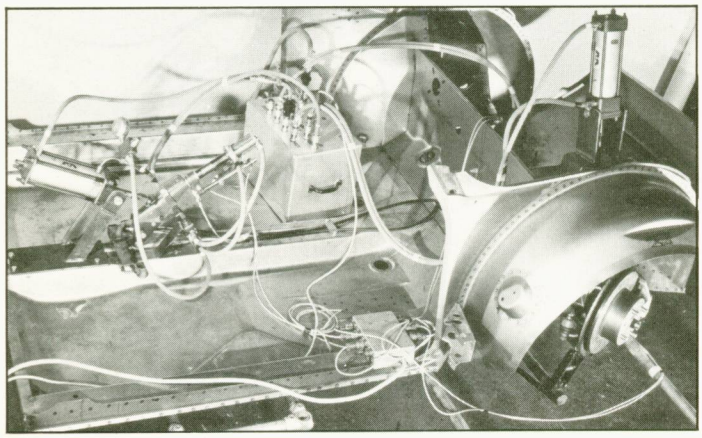

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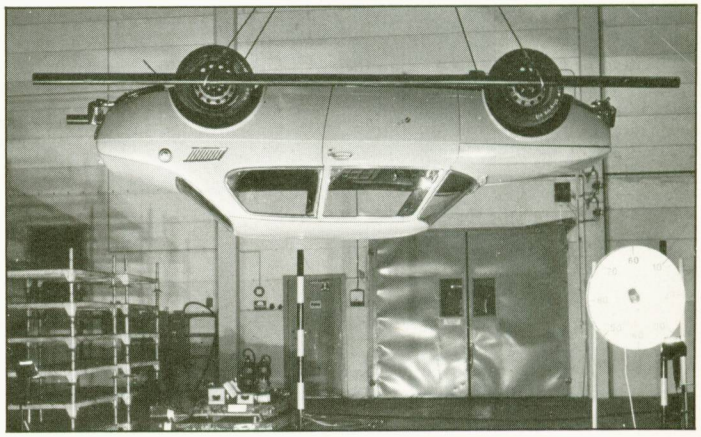

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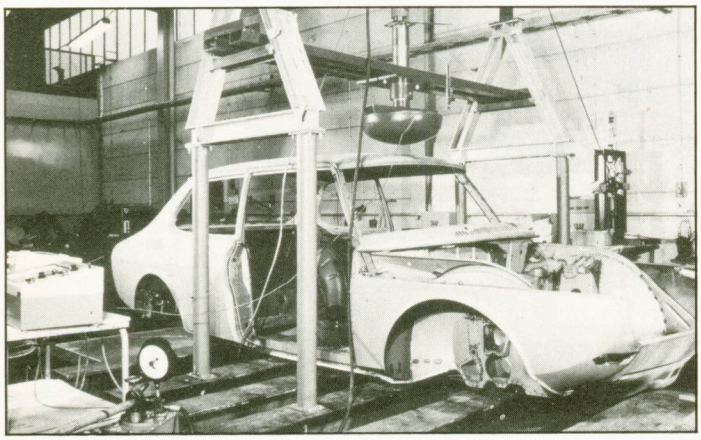

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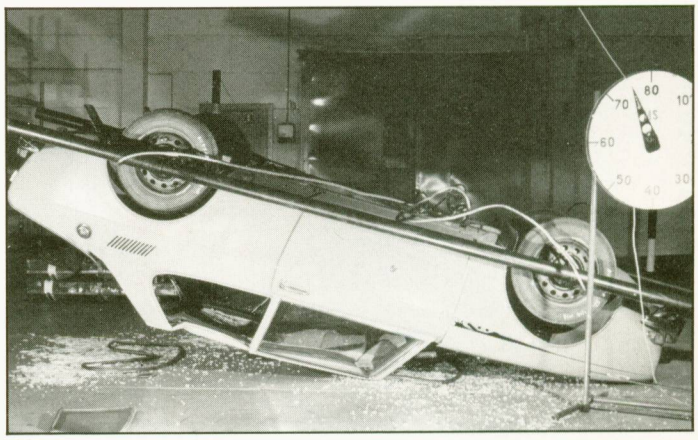

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EXTENSIVELY TESTED

British-built engine

In the Fall of 1962 the basic exterior design of the SAAB 99 was determined. Then came the question of the power plant.

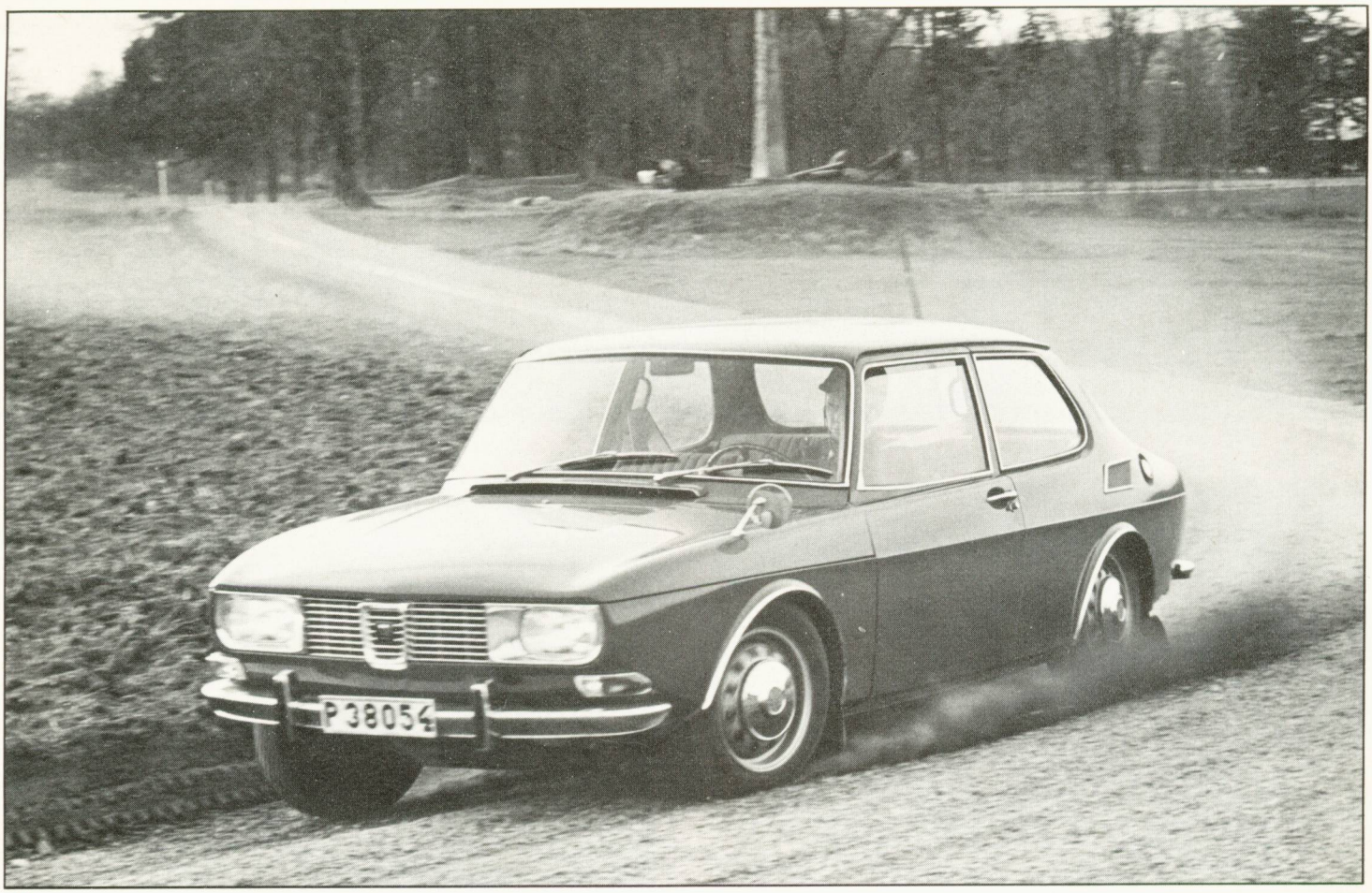
SAAB studied many possibilities in this field, including among others the new Wankel type rotary piston engine. The final choice was a straight four-cylinder engine with overhead camshaft. The British engineering firm of Ricardo & Co Engineers Ltd built a number of test engines of this type which were delivered to SAAB in the Fall of 1963. Tests at Trollhättan determined that this was the ideal type of a power plant for the new car.

Through contacts between SAAB and the large British Leyland corporation it was discovered that both companies had plans for similar engine types for the future, and it was decided that the two corporations would seek to coordinate their engine production.

The test standards applied by SAAB are extremely demanding — many series-produced engines are continually subjected to a severe test with alternating idling speed and full throttle runnig during a period of 400 hours (5). No valve adjustments must be necessary during this test, for example, which reveals the running reliability and lifetime of the engines.

The first driving test of a hand made prototype of the new car took place in June of 1965. Secretly and well disguised, the car was tested during the summer of 1965 both in Sweden and on the European continent. In January of 1966 a couple of other SAAB 99 cars were sent for gruelling winter driving, in temperatures as low as -45 degrees Centigrade (-49F).

During the whole time, supplementary tests were carried out in the SAAB laboratories — examinations of the cold-starting characteristics of the carburetor, the function of the engine and the way it ran at idling speed and how fast the passenger compartment warmed up when the car was started and run at -20 degrees C (-4 F). Also subjected to severe tests were such components in the car as, for example, the hand brake mechanism (7), the rear axle and the suspension.



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Free fall and frontal collisions

The steel body of the car includes strong windshield pillar profiles, reinforced door thresholds and side members able to stand up to lateral impact — factors which all ensure that the passenger compartment remains intact even in case of a severe collision. This has been verified in really tough tests which included dropping test cars onto a concrete floor from a height of nearly seven feet (8, 10). This results in considerable impact when the body hits the floor at a speed of about 14 miles per hour but the roof and the pillars stand up to it.

In order to find out whether the new SAAB car satisfied the safety demands in the case of a frontal collision, several crash tests were arranged so that the car ran into a concrete barrier at a speed of 30 miles per hour.

The SAAB 99 has also been put through shake bench tests (6) which are among the worst a car can be subjected to — it is run until something brakes. During this test the car is fully loaded and weighs about 3,300 pounds.

The strength of the body was also tested by measuring the tensions in the structure and noting how it was stretched when heavily loaded in various ways (9).

Acid bath shows resistance to corrosion

Of course the car was subjected to further checks on the SAAB test tracks at Trollhättan, which include all types of surfaces calculated to subject the suspension, body rigidity, shock absorbers and the entire car to maximum stresses (11, 12).

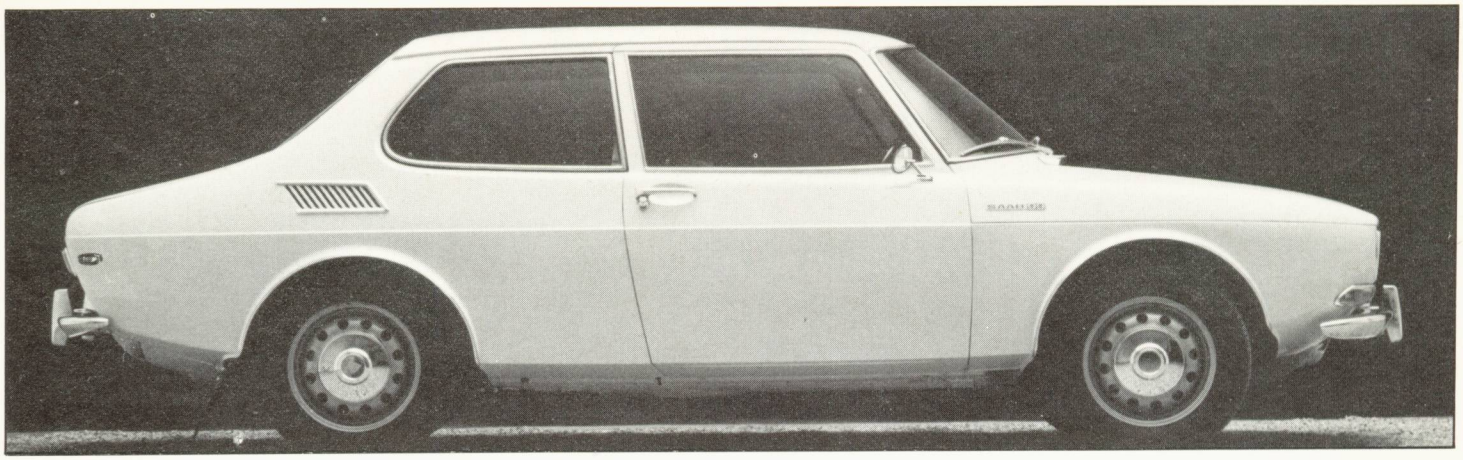
In order to measure eventual rusting, the car has been driven through extremely corrosive baths made up of acetic acid and road salt (13).

Unique tests — private drivers contributed

The SAAB 99 made its public bow in November 1967 — before the final test drivings had been completed — in order to make it possible to carry out realistic tests quite openly on the Swedish roads.

Testing has been carried out by SAAB test drivers but, in addition to this, a large number of cars were allocated to ordinary motorists all over Sweden with the right to use the SAAB 99 cars in their daily work and with the obligation to send in regular reports to SAAB concerning all their observations.

The objective of this long and extensive testing programme has been to make it possible for the SAAB company to present the customers with the SAAB 99 as a car in a fully developed condition without any "teething troubles".



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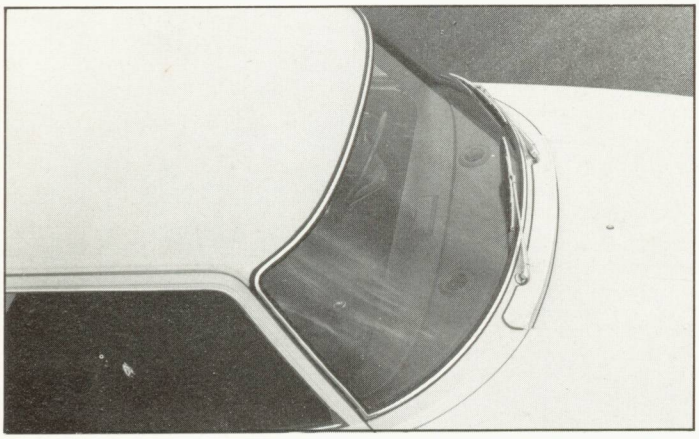

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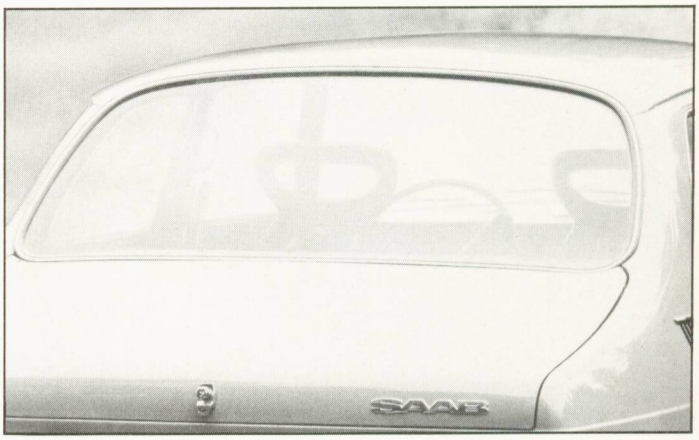

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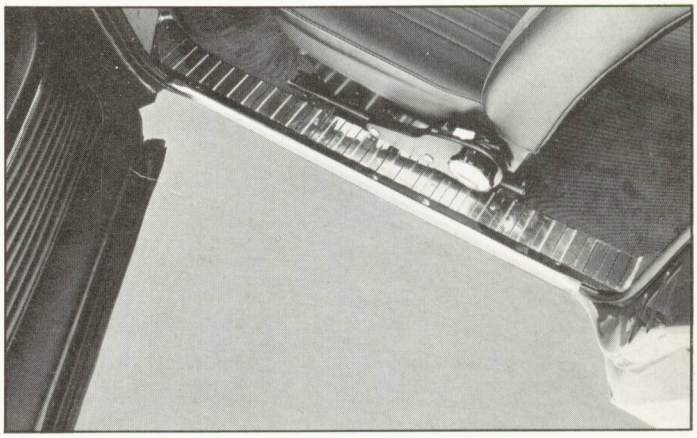

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EXTERIOR

Aerodynamic shape

The very first SAAB car, SAAB 92, was one of the world's most streamlined cars at its time. Its successors have retained the same streamline styling for lowest possible air drag. In the design of the SAAB 99 this factor has been considered absolutely essential, and the car has been given a truly aerodynamic body configuration.

Extensive wind tunnel tests were conducted before the final SAAB 99 shape was agreed upon, with the result that the car has as low air drag coefficient as 0.37. This has been reached not only because of the streamlining of the upper parts of the spacious body, but also by the smooth floor board — the engine compartment is covered underside by a metal plate, and the exhaust pipe is recessed in a tunnel. (The risk of knocking the bottom on bad bumps and damaging vital parts is almost eliminated.)

In comparison it can be mentioned that most modern standard cars have air drag coefficients of between 0.40 and 0.50.

The SAAB 99 styling with its low air resistance provides for extra savings in fuel consumption. Less power is needed to drive the car forward. The fuel saving becomes especially noticeable at higher speeds.

The streamline styling also gives other advantages: The wind noise is extremely low at all speeds, and the car is unusually free from protrusions and sharpe edges.

Sidewind stability

The need for stability in heavy side winds was also taken into consideration in the design. The car's low front end and raised rear end mean that the point of attack of side winds — the imaginary point where all sideways air currents affect the car — is located very near the car's center of gravity. The motion that, in a heavy gust of wind from the side, tries to take the car off course, becomes minimal — and SAAB 99 will stay on course regardless of the winds.

Good vision

Large windows and narrow but strong roof supports provide for good vision in all directions — the total glass area is 3,600 square inches.

The windshield pillars are placed so that they will not restrict the driver's field of vision, and there are no vent-panes in the side windows. The sloping engine hood provides for a good view of the road close up. The windshield is made of tough, laminated glass — high impact glass — designed to resist heavy impact without shattering. The other windows are made of hardened safety glass.

The windshield wiper motor has two speeds, and the pressure of the blades against the glass is maintained even at high speeds. The large capacity wind-

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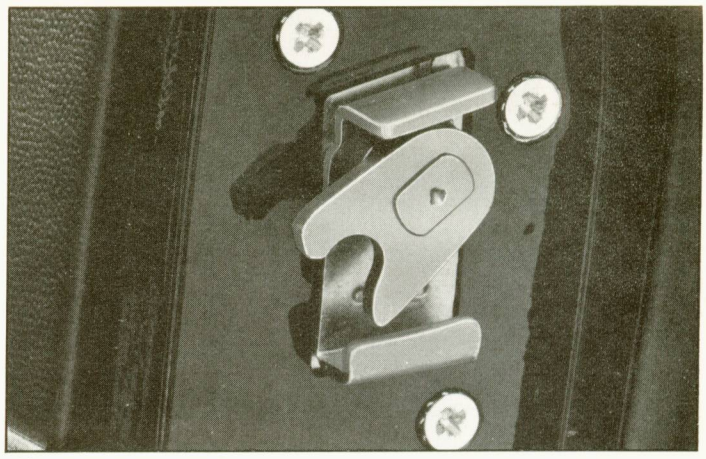

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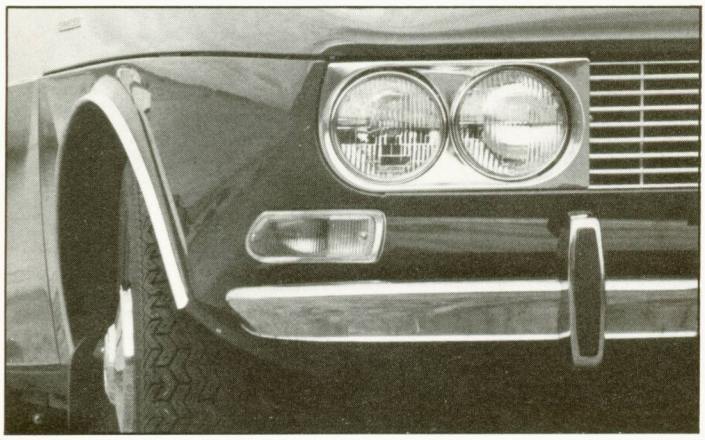

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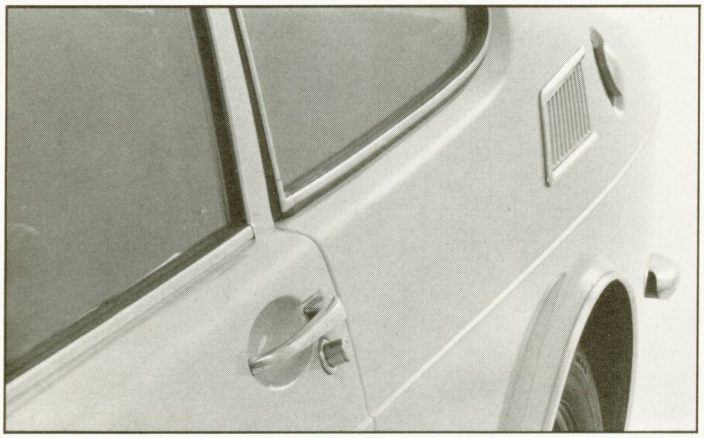

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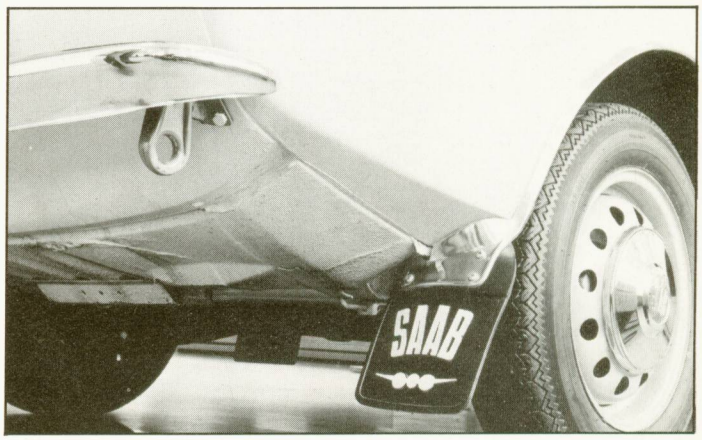

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shield washer is operated electrically. Wiper arms are made of dull finish metal. The rear-view mirrors are designed to give the driver a clear, undistorted view, and are made to break off on impact.

Wide doors — safety locks

The doors are wide enough to allow for easy entering and exiting. The door width is 37.8 in., and the doors have an opening angle of 60 degrees.
The door opening contour is recessed at the lower end — instead of following the lower outer edge of the body it forms a deep cut-out and runs close to the sill beam. The door locks are of course of the safety type, and equipped with heavy overlapping at striking plate, so they can not come open even at heavy collision impact.

Good lighting

SAAB 99 has dual headlights. Adjustment screws for the headlights are easy to reach from inside the engine compartment. Automatic backup lights and blinkers that can also be used as warning flashers, are part of the standard equipment.

The headlights are automatically switched off with the ignition current.

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14. *The SAAB 99 is designed to give low air resistance and to be roomy inside, compact outside.*

15, 16. *Glass areas are large and the pillars thin. The windshield is manufactured of high impact laminated glass. It is widely curved, while the full-width rear window is almost flat.*

17, 18. *Wide doors, and openings that form "cut-outs" at the lower body edges, allow for easy entering and exiting.*

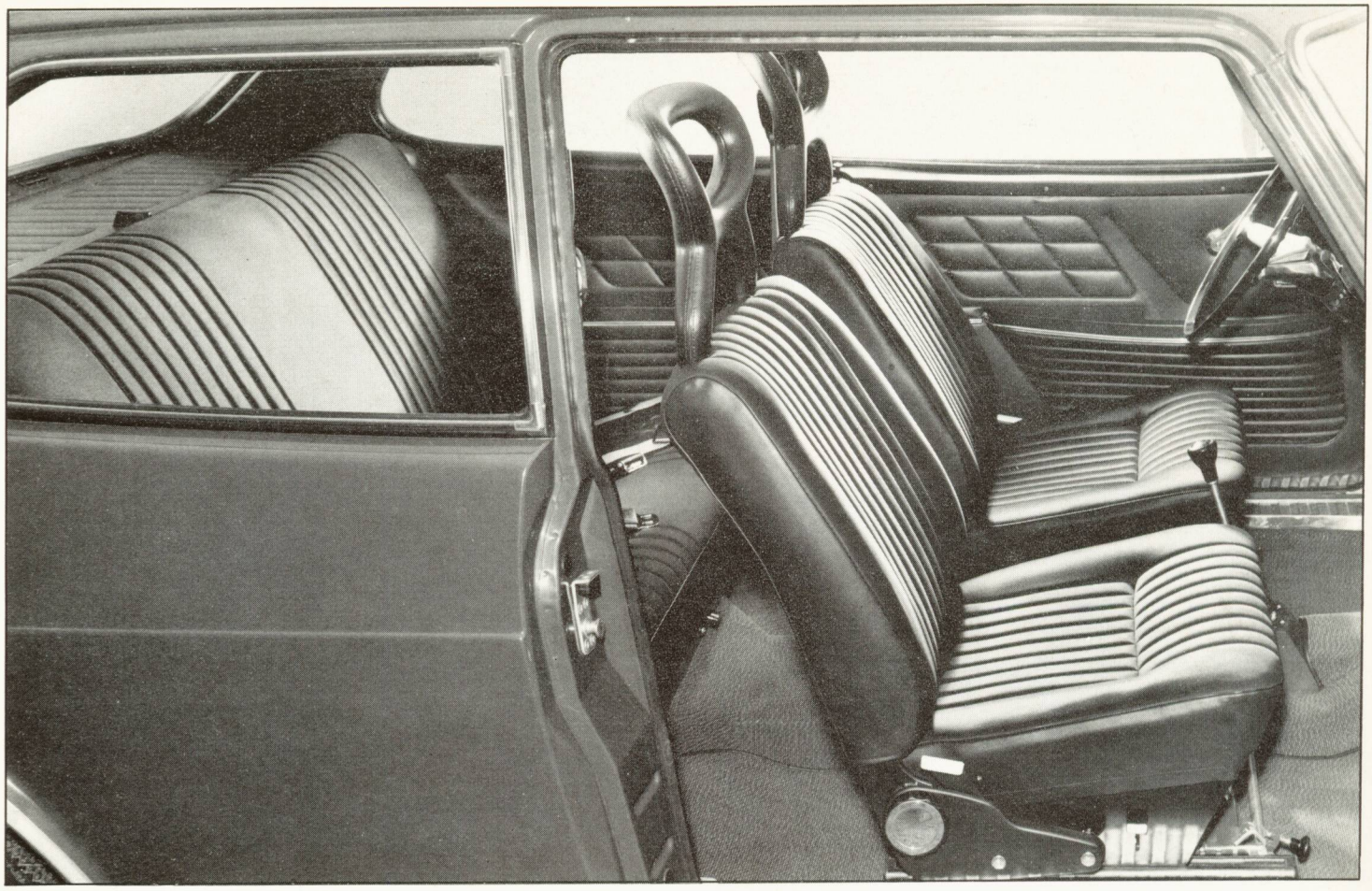
19. *The hood is stamped in one piece with the upper parts of the front fenders. It opens from the rear for safety and stands up vertically in front of the grille making the engine compartment completely accessible from both sides.*

20. *The safety-type door locks can withstand severe loads.*

21, 22. *SAAB 99 has dual headlights. The rear light assemblies include rear lights, backup lights, brake lights, blinkers and reflectors. Side marker lamps are standard. Bumper overriders have rubber inserts.*

23. *To fully utilize the body width and also to give clean surfaces the SAAB 99 has no conventional waist line.*

24. *SAAB 99 has 15-inch wheels and radial ply tires. Splash guards and towing hooks are part of the standard equipment.*



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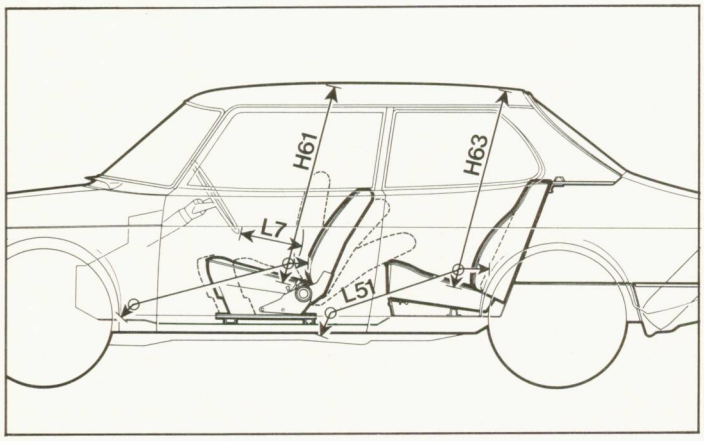

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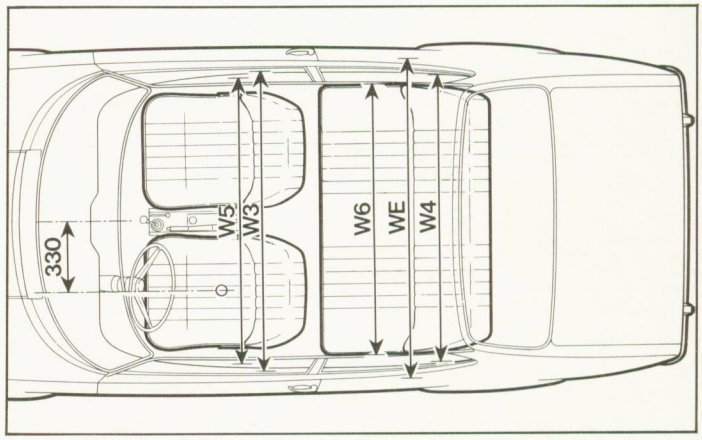

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INTERIOR

Roomy inside — compact outside

SAAB 99 measures 171.4 inches in length, 66 inches in width and 57 inches in height. It is thus one of the more compact cars in the medium size range — but only on the outside. The inner dimensions are well proportioned. For example: the rear seat at shoulder height measures all of 55.2 inches and at elbow height, 59.9 inches. Height at the rear seat is 37.7 inches and at the front seat, 38.4 inches. The front seat space allows plenty of leg room for even quite large persons. The backseat (28) will comfortably seat three persons even during long trips. The center position in the backseat is as comfortable as the side positions because of the front wheel drive and the absence of a bulky drive shaft tunnel.

Protective beams for safety

Driver and passengers sit well protected inside a "cage" of beams. Strong side beams absorb collision impacts both lengthwise and sideways, along with the thick sheet metal in the rear quarters (0.047 in.). The windshield supports (31) are made of safety profiles to keep the roof from caving in in case of a roll over. The roof line also has an extra protective profile all around. Front and rear ends are designed to absorb impact.

Top comfort for safe driving

Safe driving depends to a large extent upon the comfort of the driver. That is why SAAB 99 has been equipped with comfortable separate front seats that can be adjusted to fit all drivers. The rake of the backrests can be adjusted within two wide ranges by a turn of a wheel (33). The first range is called the driving range and allows a rake between 12 and 40 degrees. The other range is for resting and allows the reclining of the seat from 45 to 68 degrees. A safety catch prohibits the backrest from being turned from driving to rest positions by accident. From the rest position the seat back can also be moved to a nearly horizontal position, but only after the catch once again has been released. The front and rear edges of the seats can be independently raised and lowered by 0.7 in. and 1.0 in. respectively (32) — so that both the height and the angle of the seat can be properly adjusted. The seats can of course also be moved forward and back, for a total distance of 6.3 in. Both doors hold roomy pockets in combination with elbow rests (29). The dashboard contains a glove box with lock.

Injury preventive safety

The backrest is designed to give at a heavy impact from the rear, to protect front seat passengers from so-called whiplash injuries.

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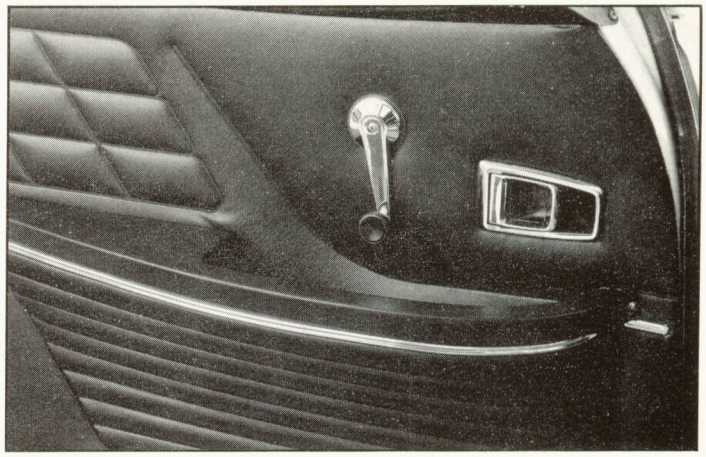

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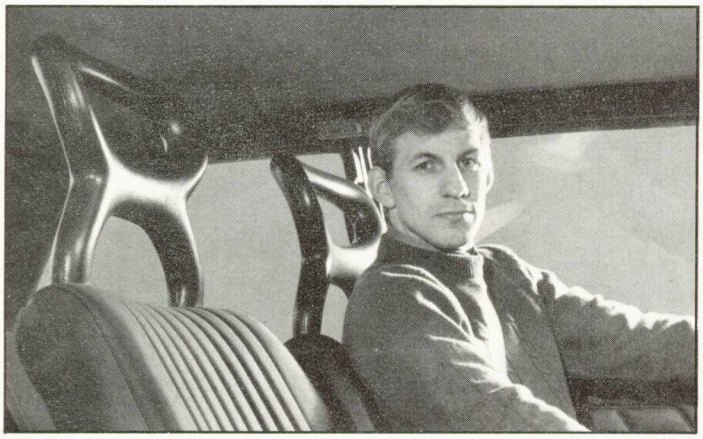

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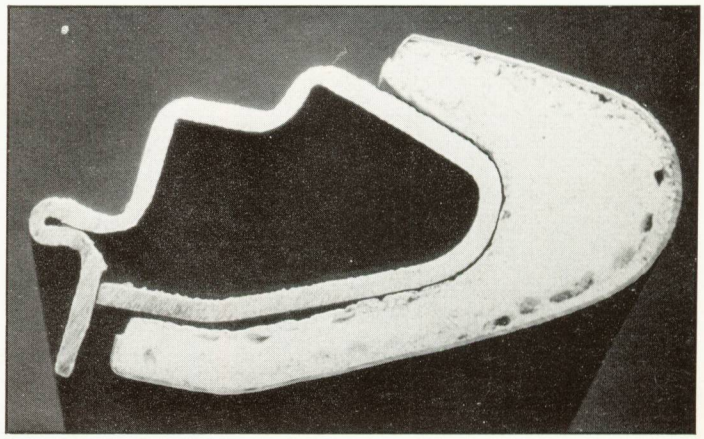

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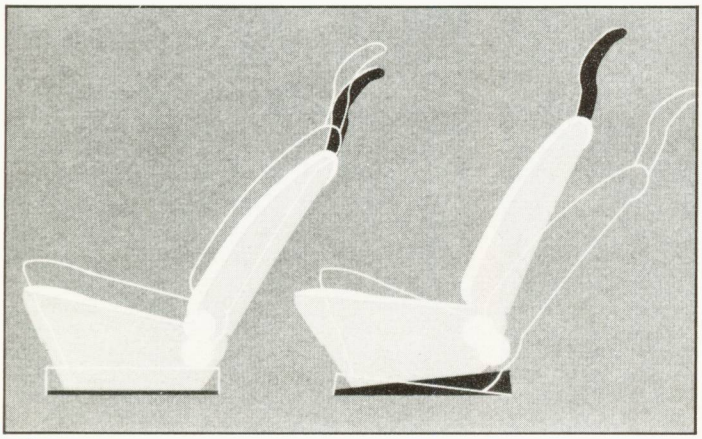

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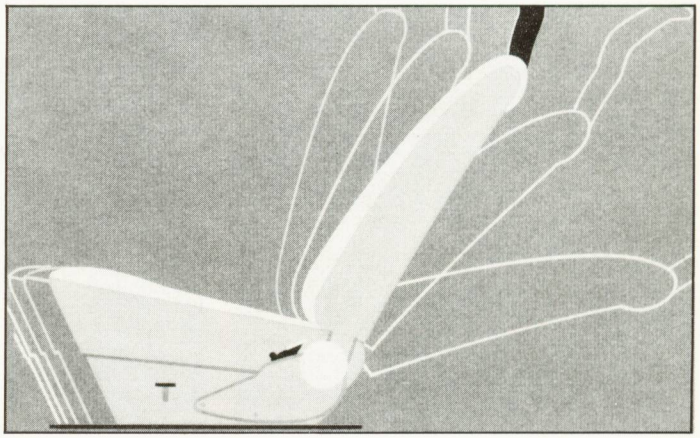

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Also a part of the SAAB 99 safety equipment are the unique full visibility headrests (30) designed to protect driver and front seat passenger at impact, while also allowing full visibility in all directions for both front and back seat riders. The doughnut shaped headrests are manufactured of steel tubing with a protective padding.

An automatically locked latch keeps the back rest firmly in position during driving, but can be easily released to allow backseat passengers to get in or out.

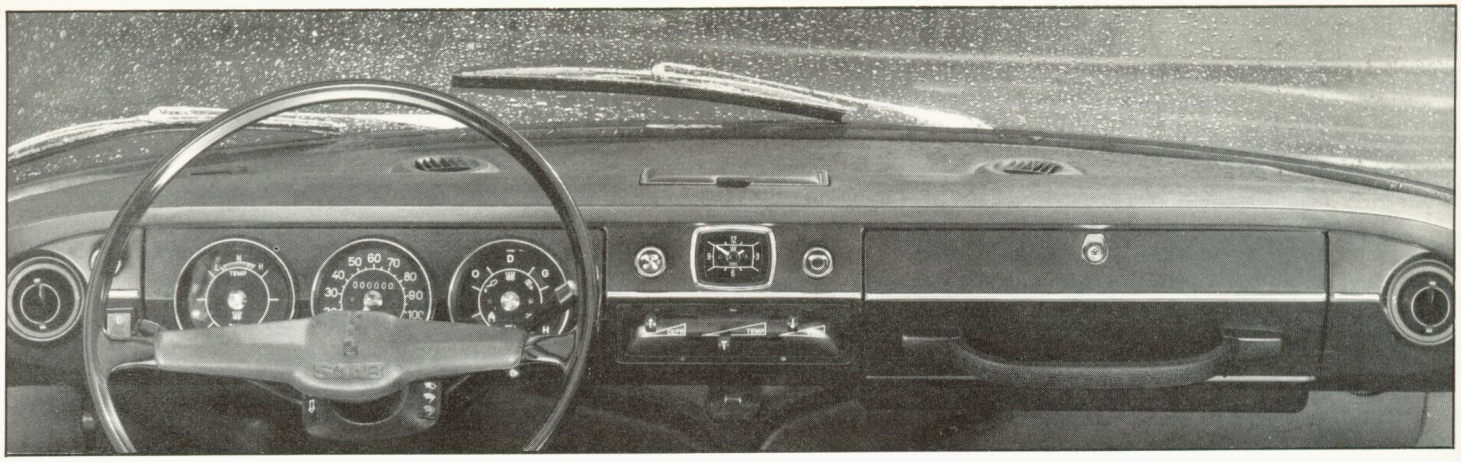
All window frames are covered with impact absorbing upholstery. The soft metal instrument panel will give at impact and is covered with padding on top. All seats are securely fastened to the body, and the upper edges of the front seats are padded with foam plastic.

The three-point safety belts for the front seats are easily adjustable. The back seat has lap-type belts.

SAAB 99 inside dimensions

H 61,	Effective head room, front seat	38.4 in.
H 63,	Effective head room, rear seat	37.7 in.
L 34,	Max. effective front leg room — accelerator	39.1 in.
L 51,	Min. effective rear leg room	36.9 in.
L 7,	Steering wheel to torsoline	13.0 in.
L 17,	H Point travel (seat adjustment)	6.3 in.
L 40,	Front seat back angle (Adjustable from 12° to 40° and from 45° to 68°)	20°
W 5,	Front hip room	51.9 in.
W 6,	Rear hip room	51.4 in.
W 3,	Front shoulder room	53.2 in.
W 4,	Rear shoulder room	55.2 in.
WE,	Elbow room rear	59.9 in.

(All measurements with the front seat in the lowest and rearmost position — SAE paper 662A)



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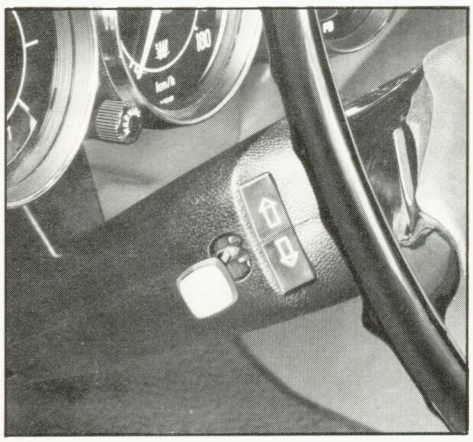

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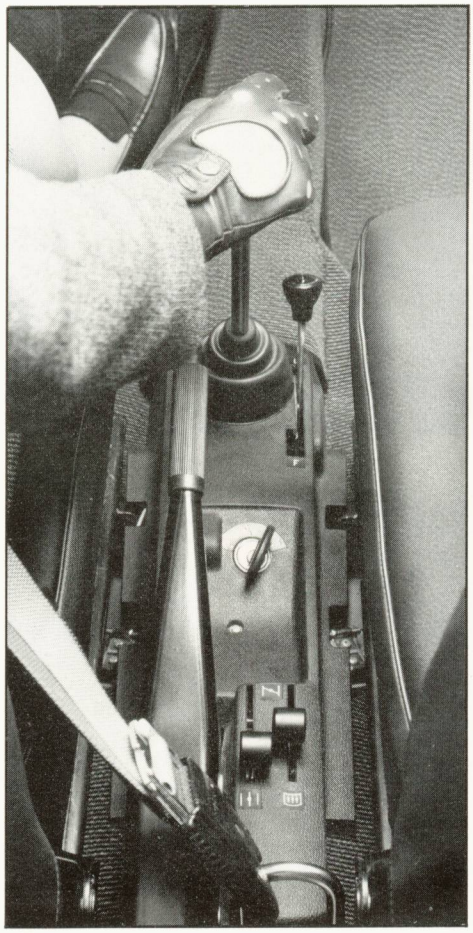

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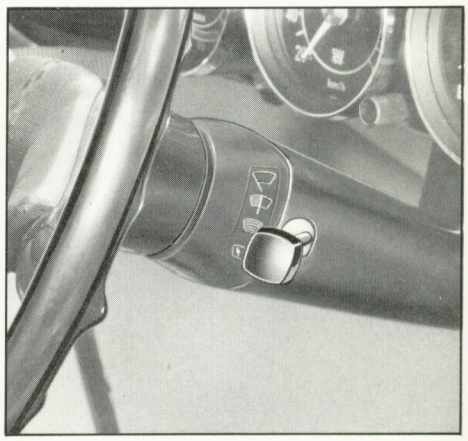

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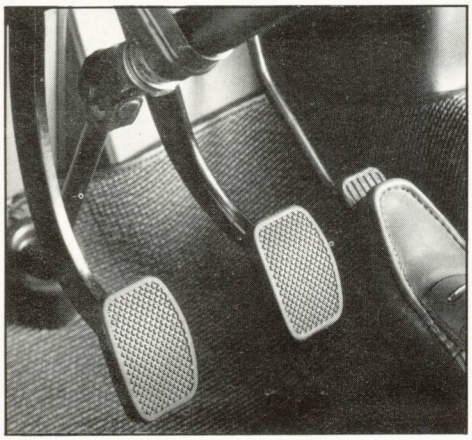

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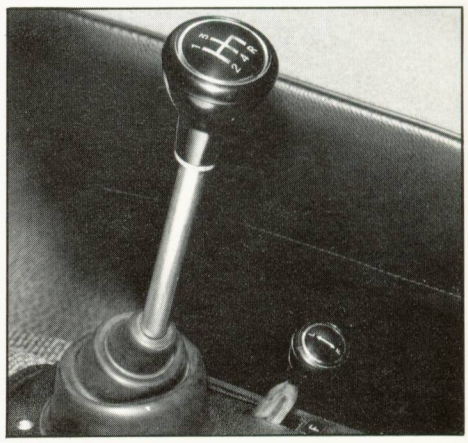

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INSTRUMENTATION AND CONTROLS

Safety dash

The SAAB 99 dash board is constructed of thin metal, so it can give on impact. The upper part of it is upholstered with impact absorbing cellular plastic.

Easy-to-read instruments

In a black, non-glare instrument cluster — directly in front of the driver — are three round instruments (34, 40): speedometer plus two combination gauges. The left hand combination dial contains the fuel gauge with a warning light to advice the driver when he is running short of fuel, and a temperature gauge. In the center is the speedometer, which has easy-to-read white figures on a black background, and is graduated to 110 mph. It also contains an odometer. The right hand dial contains indication lights for high beam and blinkers, and warning lights for low oil pressure, loss of battery charge, pulled handbrake, as well as a large red lamp to alert the driver to any possible brake line failure, by indicating if the brake pedal has to be pushed deeper than normal before necessary brake effect is reached.

Safety belts

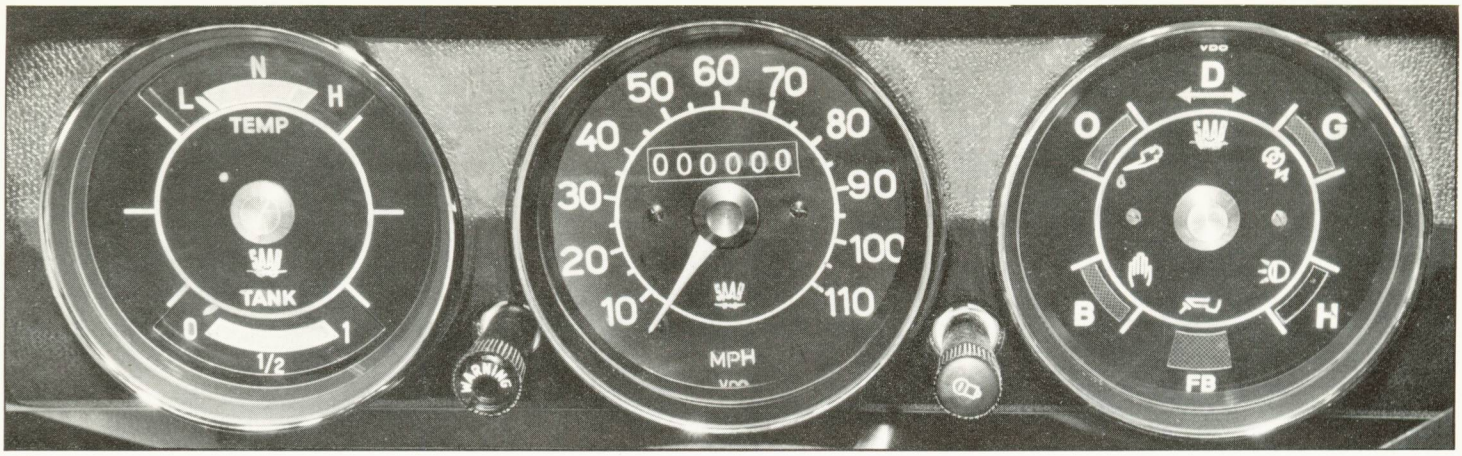
SAAB 99 has three-point safety belts for the front seats. They are easy to operate and separately adjustable for the lap and chest sections. The back seat is equipped with lap belts.

Easy-to-reach controls

Wearing his safety belt, the driver can easily reach all controls on the dash and on the steering column.

On the left hand side of the dash are the cold start device (choke) and the headlight switch. The headlights are connected with the ignition lock so that there is no risk of leaving the car with the headlights on.

In the instrument cluster, directly in front of the driver (40), is a rheostat control for the instrument illumination. The knob can also be pulled out to turn on the parking lights, regardless of whether the ignition is on or off. To the left of the speedometer is the warning flasher switch — with a built-in indicator light.



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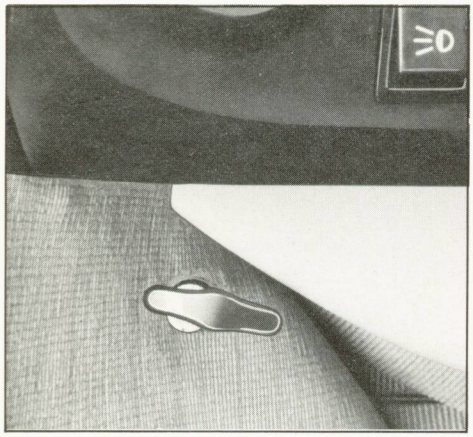

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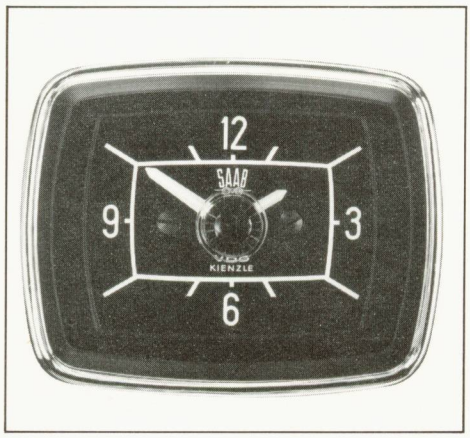

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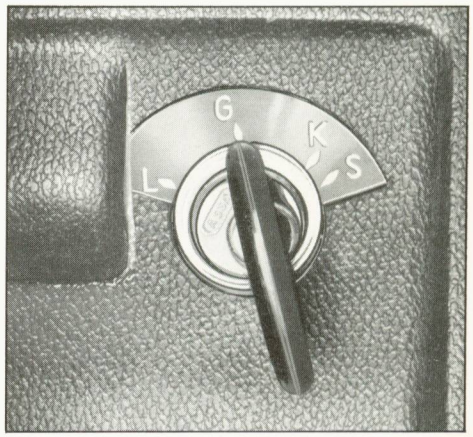

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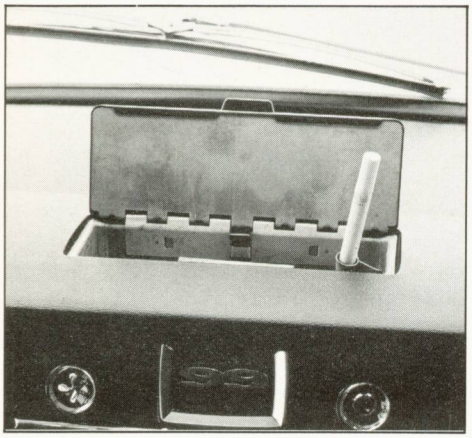

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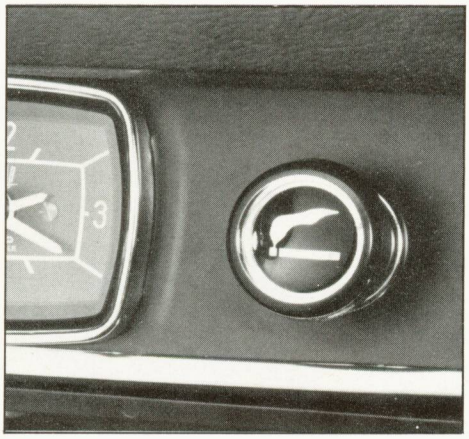

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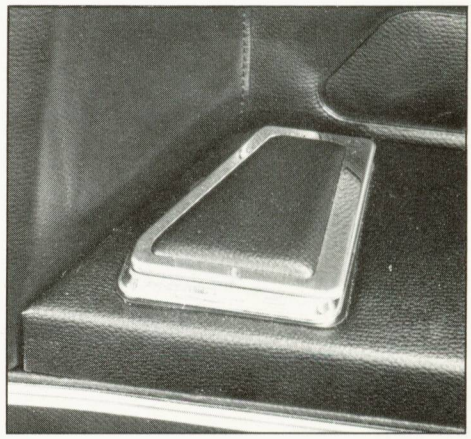

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On the dashboard, to the right of the driver, are the switch for the two-speed fresh-air fan, the electric clock (42) and the cigarette lighter (45). Below the clock are the controls for heating and defroster.

On the steering column, to the left of the wheel (35), is a lever for operating the blinkers and to switch from low to high beam.

At the right of the column (36), another lever operates windshield wipers and washer, as well as the signal horn. The windshield washer will work in two positions: if you bring the lever downward, you get both washing and top speed of the wipers; if you move the lever away from the driver, washer will work without any wiping.

All controls are clearly marked with explanatory symbols.

In a console between the front seats (38) are located the combined ignition and gear shift lock, the gear shift lever (39), the free wheel control lever, and controls for the rear seat heating and rear window defroster. Also placed between the front seats is the hand brake lever. The ignition lock is illuminated, and the key is rubber covered.

To the left, under the dashboard, is the handle to release the hood lock (41).

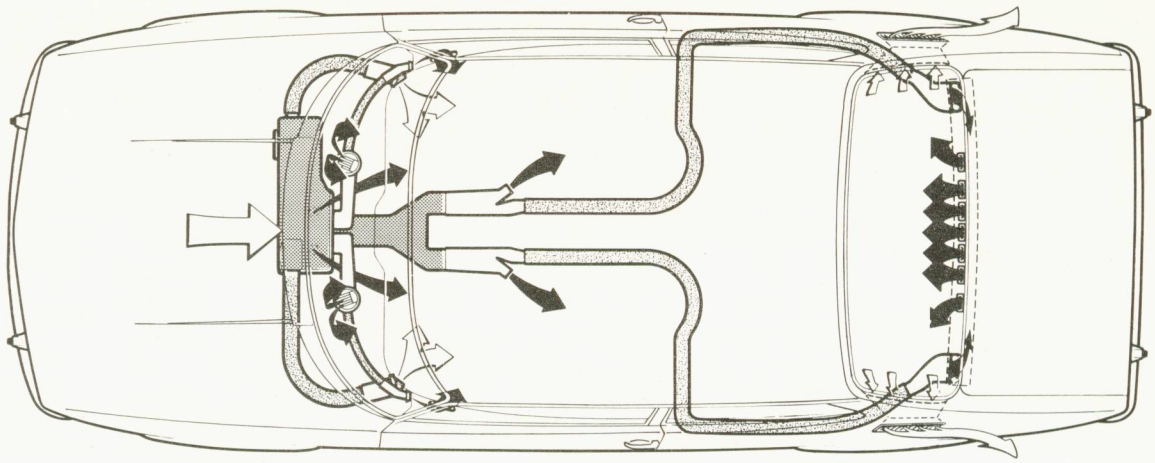
The control pedals (37) are suspended from above (American style) with large, nonslip pads.

There are two ash trays in the car, one on the dashboard (44) and one for the rear seat passengers (46).

Two-speed windshield wipers — electric washer

The windshield wipers have a two-speed motor, and wiper blades are designed to maintain constant pressure on the windshield even during high speed driving.

The electric windshield washer is of the high-capacity type with a container for three pints of washer liquid.



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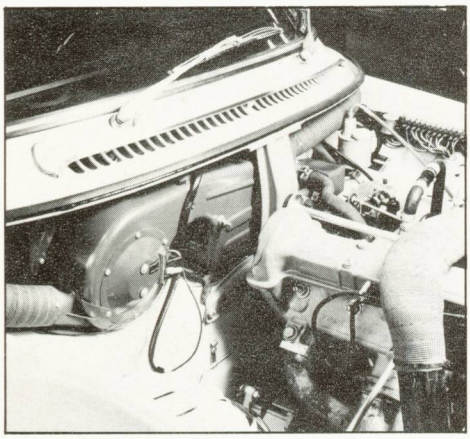

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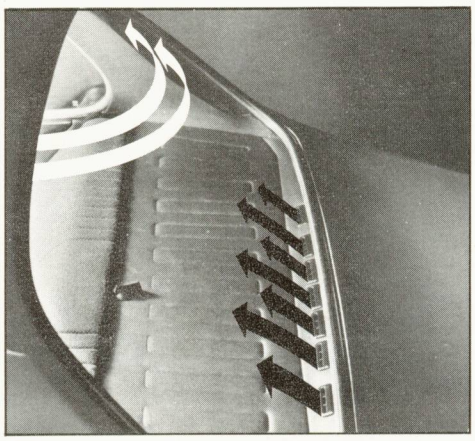

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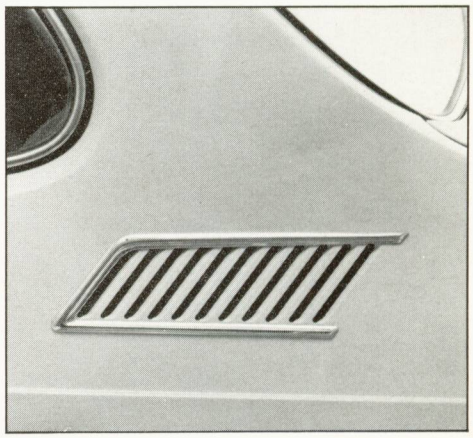

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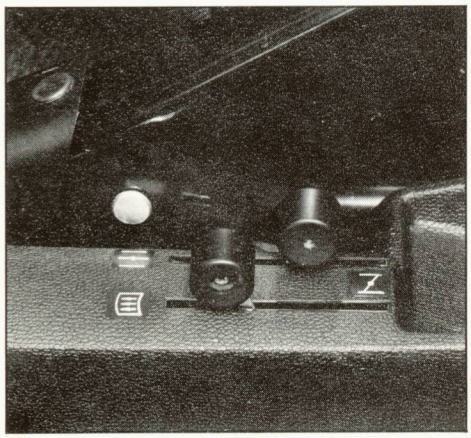

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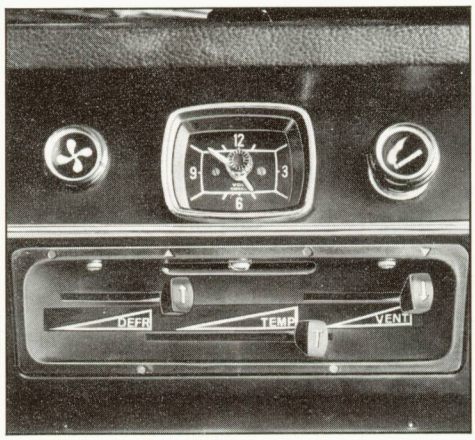

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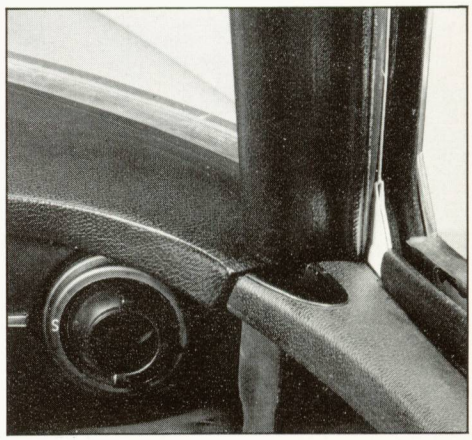

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HEATING AND VENTILATION

The heating and ventilation system in the SAAB 99 is really outstanding (47). It has a very high capacity and includes such features as separate outlets for the rear passenger compartment and a thermostatically controlled heater.

Effective air exchange

Air is circulated throughout the passenger space. It enters — cold or hot — through the heater outlets, and is evacuated through openings in the rear window pillars to vents in the body sides (49, 50). The location of the vents has been wind tunnel tested to attain the best suction, and to avoid any possibility of a reverse flow of exhaust fumes in heavy side winds.

Individual heat controls for front and back

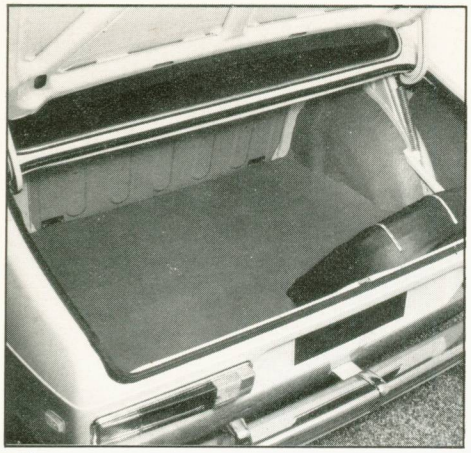
Both front and rear seat passengers get warm air through separate outlets in the floor, and back seat passengers can personally adjust the air flow to the rear outlets (47, 51). The fresh air intake is located just in front of the windshield (48). During regular highway driving, the speed is enough to force plenty of air into the system. At lower speeds, a two-speed electric fan will force in the air. The fan (48) can be adjusted for summer use, and will then increase the fresh-air flow into the car by some 30%.

Defroster for windshield, side and rear windows

Two large defroster openings above the dash keep the windshield clear. Defrosters are located so that the airstream can reach all parts of the windshield. Through openings in the doors (53), warm air is directed to the side windows. Warm air — or cold — is also forced through canals and hoses to outlets at the rear window (49) to allow clear vision through this window, too. The airstream to windshield and side window defroster outlets can be adjusted with a separate dashboard control (52). The airflow to the rear window outlets is adjusted with a lever between the front seats (51).

Extra cold-air outlets

The dashboard also has two additional air outlets for cold air. Air flow can be adjusted independently of the heating system and can be directed to where it is needed. At lower speeds the heating fan can be used to force cool air through these outlets (53).



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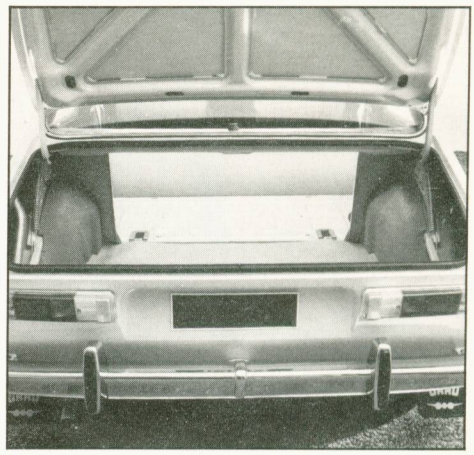

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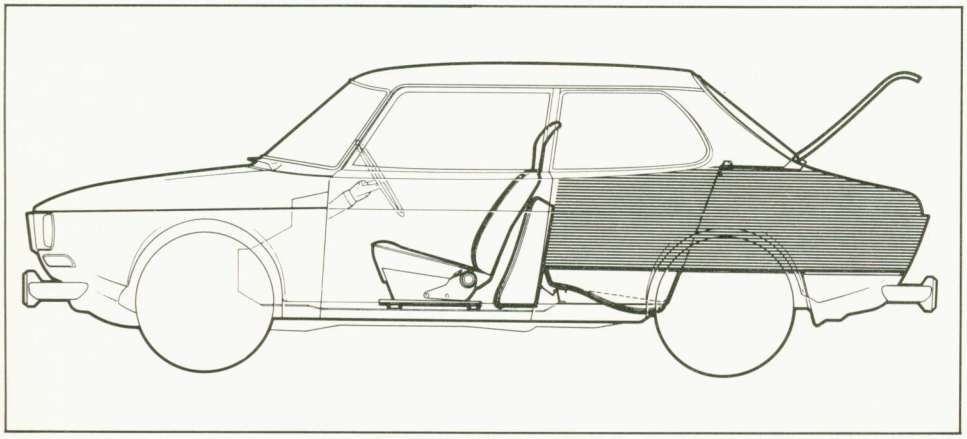

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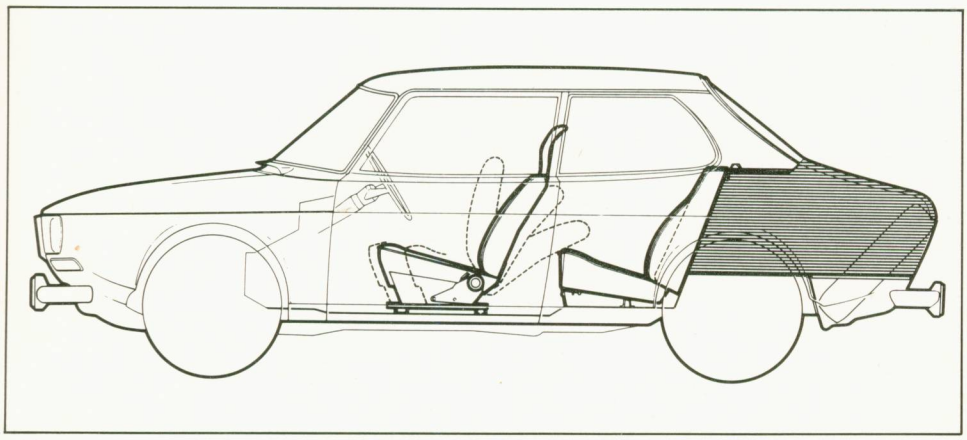

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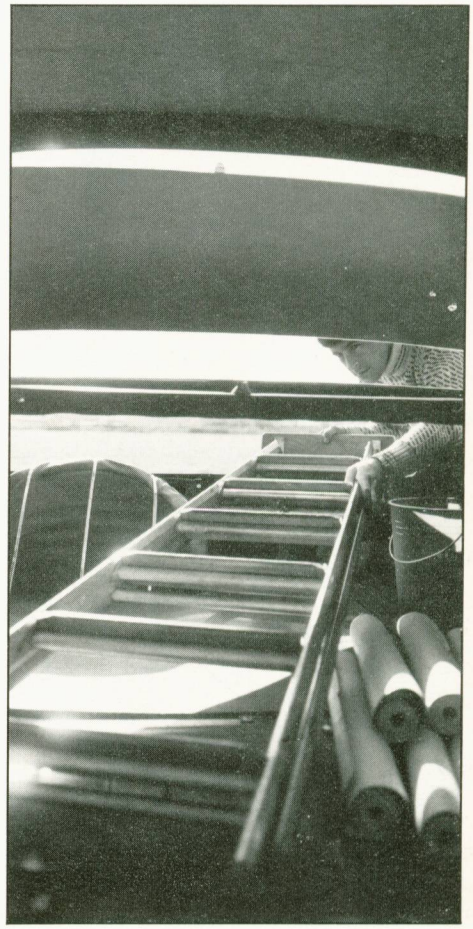

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BAGGAGE AND CARGO SPACE

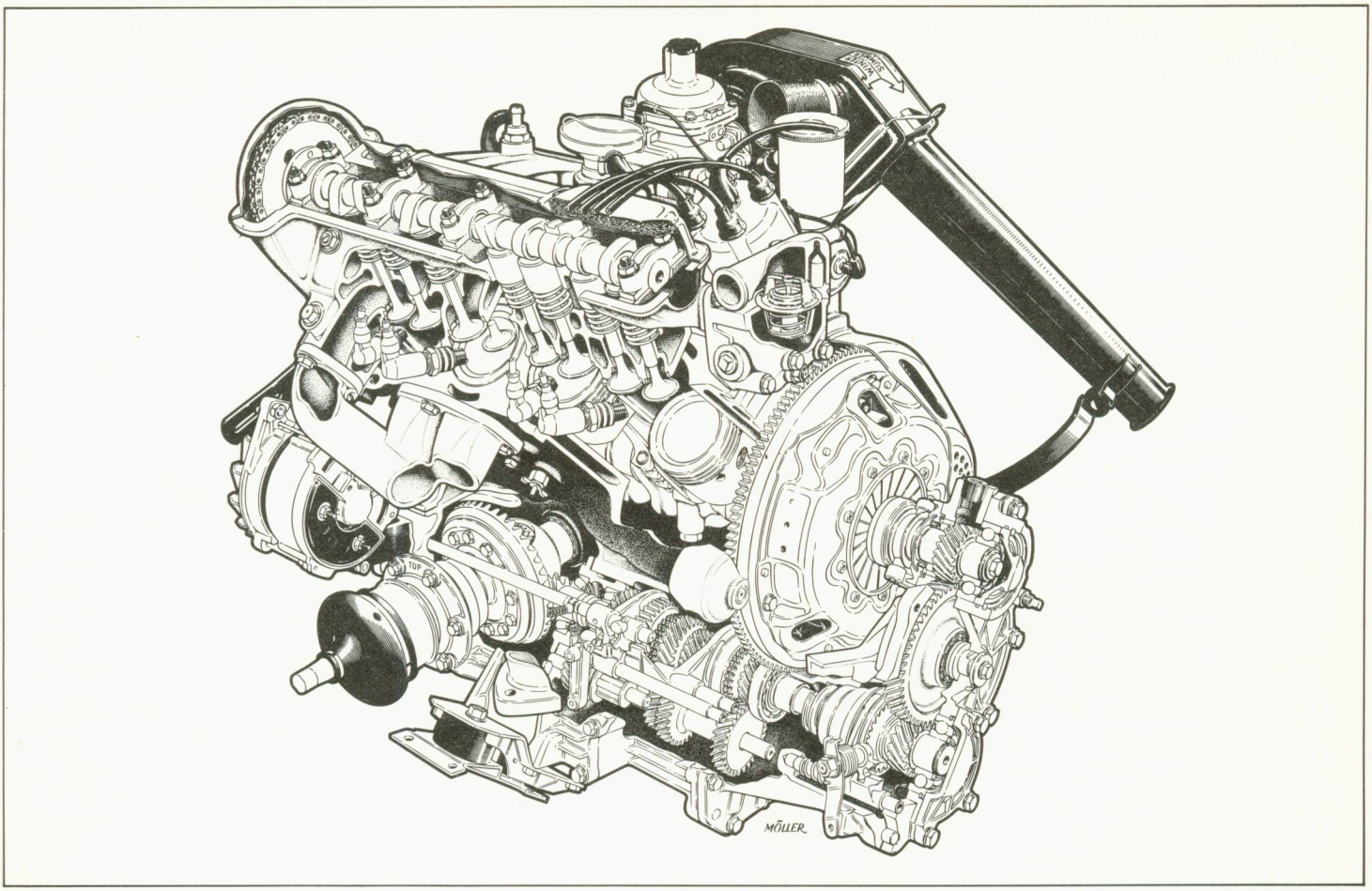
Roomy luggage compartment

The SAAB 99 trunk capacity is 12.3 cubic feet, measured according to SAE standards. The spare tire is placed against the rear edge of the trunk for easy accessibility (54). It is covered with protective material and can be used as a support, when heavy loads have to be removed from the trunk. Tools and other accessories are placed in a covered compartment near the rear edge of the trunk. The trunk lid is spring balanced, and a light is automatically turned on when the trunk is opened.

Semi-Station Wagon

The baggage space can easily be increased by a simple relocation of the rear seat. The seating pad of the back seat is folded forward to rest on its front edge behind the front seats (57, 58). A latch on the rear deck is released and the back rest is folded forward, revealing a metal covered floor and a cavernous cargo space which together with the regular trunk space has a flat floor 69 inches long. The full cargo floor capacity (56, 59) is 51 inches wide (43 in. at the wheel wells). As a semi-station wagon the SAAB 99 has 23 square feet of cargo space, with a practical payload capacity of 800 pounds.

SAAB 99 is also designed so that a trailer hitch can be easily attached.



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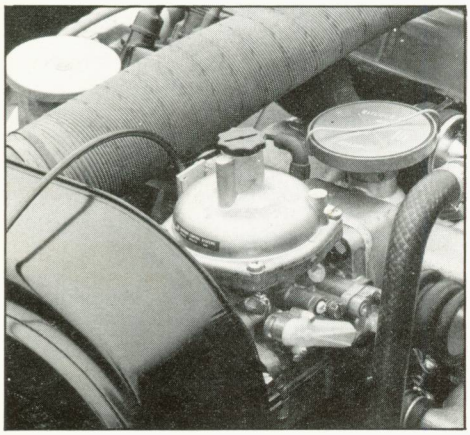

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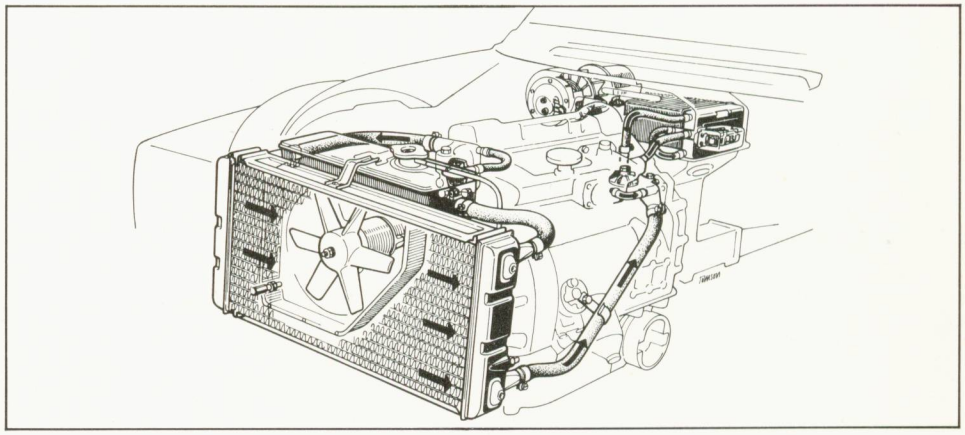

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ENGINE AND TRANSMISSION

SAAB 99 has a modern engine that is agile, and still tough. Thousands of test hours under the most adverse load and temperature conditions have proven its dependability as well as its suitability for the size and weight of the car. It has an overhead chain driven camshaft. The crankshaft rides on five main bearings for strength and balance. The clutch has been placed at the front of the engine for maximum cooling and ready accessibility. Power is carried from the clutch by a primary gear to the transmission and differential. Both are located below and to the side of the engine. Because of the location of the clutch and transmission, most of the usual compact car transmission noise is kept out of the passenger compartment.

The powerplant is designed by the engineering firm of Ricardo & Co., Engineers Ltd., in Great Britain, manufactured by Standard-Triumph, and thoroughly tested by SAAB.

The engine is a straight four-cylinder unit with a displacement of 105 cubic inches. Maximum output is 87 horsepower, SAE, at 5,500 rpm. The engine has very good hard pull characteristics — the torque is higher than 75 lb. ft. over a large speed range (from about 1,000 to 5,000 rpm). Maximum torque is 98 lb. ft. at 3,000 rpm.

The modern design is exemplified by the bore and stroke which is 3.29 in., and 3.07 in., respectively. The engine is thus somewhat "over square". The specific effect is only 51 bhp., SAE, per 1,000 cc. cylinder volume. It is by no means a super tuned sports car engine, but instead a tough and still agile workhorse.
The fuel consumption, according to the DIN standards (consumption plus 10% at half load and constant speed, equals 3/4 of the top speed) is 26 mpg. Top speed is about 95 mph. Acceleration, 0—62 mph is 14.5 seconds, and the quarter mile — (0 to 400 m) is reached in 20 seconds.

Five main bearings

The engine block is manufactured of special cast iron, and the crankshaft has five main bearings. The crankshaft itself is made of forged steel and has overlapping pivots. It is a solidly built engine, extremely durable and tough. For adequate lubrication, even during hard running conditions, it has been equipped with separate lubricating oil canals from the main bearings to every connecting rod bearing.

Overhead camshaft

The overhead camshaft is driven by a single track chain at the rear end of the engine. As there are no push rods and rocker arms (60), and the camshaft operates the valves almost directly (via light valve depressors only), the valve mechanism can withstand high rpms without noise or damage, and valve adjustments are needed less frequently than with a more conventional system.

Aluminum head

The cylinder head is manufactured of aluminum alloy and is of the cross-flow type with inlet manifold on one side and exhaust manifold on the other. This way the manifolds have been made sufficiently large and have been given the right shape to assist the strong pulling abilities and the "free breathing" of the engine. The one row of cylinder head bolts is located at an angle so that all bolts can be reached without the need for first removing camshaft and valve mechanism. The SAAB 99 engine is probably the only overhead camshaft plant to offer this service facilitating detail.

Idler shaft

Power to drive the fuel pump, the water and oil pumps as well as the distributor is transmitted by a special idler shaft which is driven by the camshaft chain.

45 degree angle

The block is set at a 45 degree angle to the right. This eases the accessibility to such items as carburetor, distributor, fuel pump and oil filter. The angle has also enabled the designer to lower the hood, for increased close-up visibility.

Carburetor for Nordic climate

The SAAB 99 engine is equipped with a horizontal flow Zenith-Stromberg CD carburetor (61) specially developed for SAAB to give sure starts even in the coldest weather. (Hard tested at temperatures down to —49°F).

The CD type was selected to give maximum performance both for economy and for engine effect over the entire speed range. It has a special emulsion system for cold starts. To allow steady idling and to meet SAAB's high demands for long service intervals, the metering needle is mounted so that it is always self centering and does not require adjustments. Oil for the carburetor's damping cylinder need not be checked or changed until after 6,000 miles of driving.

96 octane fuel

The engine has a compression ratio of 8.8 to 1, but it still does not have to be run on premium grade gasoline. Fuel with an octane rating of 96 (according to the research method) is sufficient. This is possible thanks to the fact that the cylinder head is of light metal alloy, and very effectively cooled. Not even during forced high-speed driving is there any risk for spontaneous ignition or detonations.

The strong pull of the engine over the entire speed range is also helped by the advantageous design of the intake manifold and the "bathtub" shape of the combustion chambers. The inrushing fuel-air mixture is set into a strong turbulence with the result that the fuel is effectively mixed with the air and is more completely burned, even at low speeds.

The mechanical fuel pump with filter is located, easy to reach, on the upper part of the block. An arm on the pump allows a person to hand pump fuel should the fuel system lines, for one reason or another, become empty.

Low intake noise, pre-heating device

The air cleaner which has an easily replaced paper filter, also functions as an intake muffler. The intake pipe is tuned to give the most efficient muffling and the least air stream resistance.

A handle on the air cleaner (66) makes it possible to change the air intake from not pre-heated air (for summer driving) to pre-heated air (for winter driving).

The engine intake manifold is also heated by hot coolant so that the distribution of the fuel-air mixture is more even and effective. This helps purify the exhaust, and the engine will run evenly almost immediately following a cold start.

Closed crankcase ventilation

The crankcase ventilation is completely enclosed with connections to air cleaner and intake manifold, which allows more efficient combustion and purer exhausts.

Oil pan with cooling fins

The SAAB 99 engine has circulation type lubrication with a full flow type oil filter (63). The oil pan is manufactured of light metal and equipped with cooling fins. It is cooled by air from an inlet in the sheet metal under the engine compartment.

Thermostat controlled fan

SAAB 99 does not have a belt driven cooling fan, constantly in motion and stealing power. Instead the car is equipped with a fan run by an electric motor (62) that is automatically started by a thermostat control, when needed; for example, during crawl in traffic jams.

Fast heat after cold start

The cross flow type radiator (62) is capable of cooling the engine even during mountain driving with a trailer. It has a separate expansion tank to minimize the risk of loss of coolant during expansion. The expansion tank takes the temporary overflow and returns it automatically to the system when it cools.

The high capacity water pump rushes the coolant at high speed past the hottest parts of the engine, so that those parts that need the most cooling get the most.

The system is thermostat controlled with a reliable wax thermostat. The effectiveness of the cooling system allows the use of a rather small amount of coolant, and thus faster engine warmup after cold starts. The fast heating is also assisted by the fact that the fan is not permanently in motion.

Easy to reach clutch

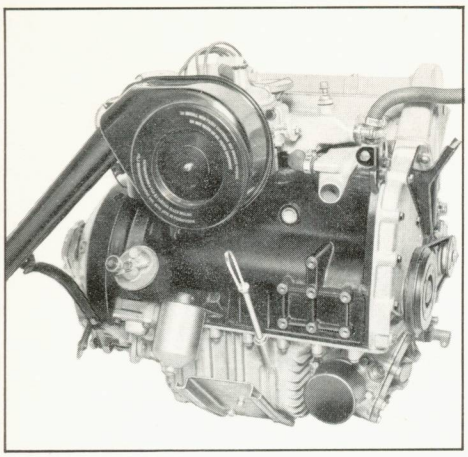
The dry plate clutch is of the fan type (60), a construction which, in connection with the hydraulic power transfer from the pedal, makes the clutch extremely easy to maneuver.

Placed at the front of the engine, the clutch is effectively cooled, which helps prolong the life of the clutch disc pads.

The front location of course also eases service. To remove the clutch only the radiator and the clutch housing need to be removed, after which the clutch axle is removed and the clutch can be lifted right out.

Free wheel drive

Power is transmitted from the clutch through a primary gear. It has spirally cut teeth for silent running, and its front location keeps any noises from entering the passenger compartment. After the primary gear is a free wheel drive, easily engaged or disengaged through a lever next to the gearshift (38, 39). When the lever is in its forward position, the free wheel is locked out; when the lever is in the rear position, the free wheel is engaged. The free wheel helps cut down on fuel consumption, and is also considered a safety feature, especially during driving on icy and slippery roads. (Automatic declutching the moment the gas pedal is released). Driving with free wheeling allows practically clutchfree operation — a feature that can be extremely helpful in city traffic.



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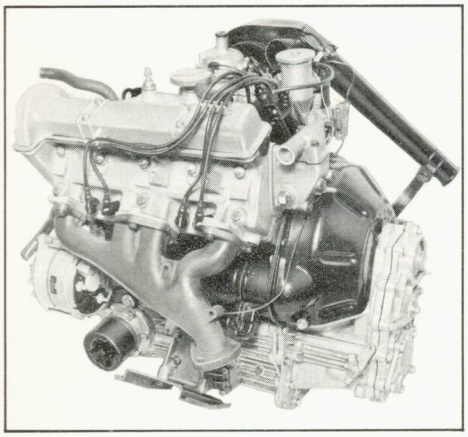

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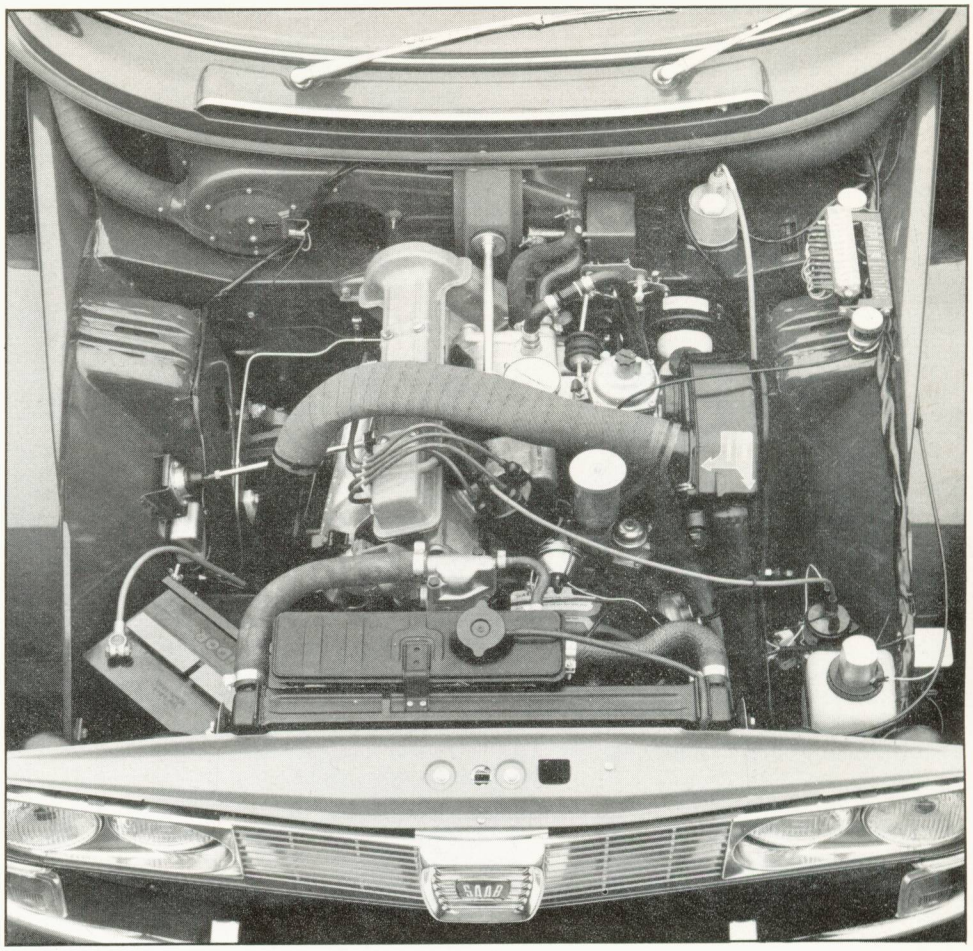

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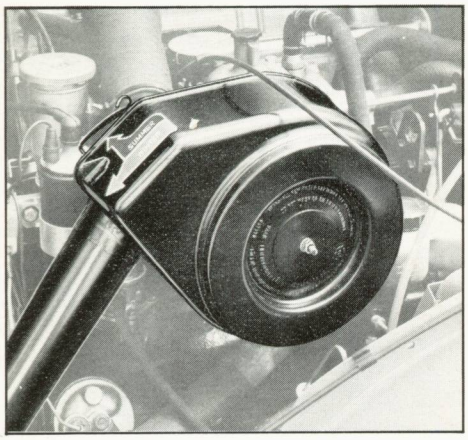

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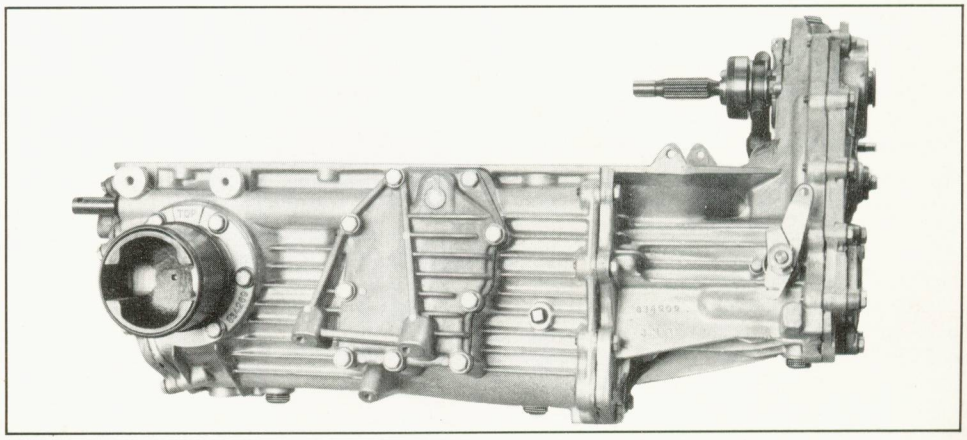

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Compact drive train

The gear box and final gear in the SAAB 99 are placed under the engine and mounted together with the engine into one compact unit. This arrangement saves space and helps give the ideal distribution of weight between the car's front and rear wheels. Even though the transmission and the engine are in one unit (60, 63, 64), they have completely independent lubricating systems. The transmission has a combined splash and circulation lubrication system. The crown wheel of the final gear pumps oil into a canal leading to the gearbox and the primary gear. Through other canals, the oil returns to the final gear. Cooling fins, both inside and outside the gear box housing (67), keep the gear box oil at proper operating temperatures.

Short, sporty gear shift

SAAB 99 has a short, sporty floor mounted gear shift in a console between the front seats. As the lever directly moves the gear shifting forks, shifting only requires short throws into distinct positions. The four forward gears have effective and fast working lock synchromesh. The fourth gear is a direct gear.

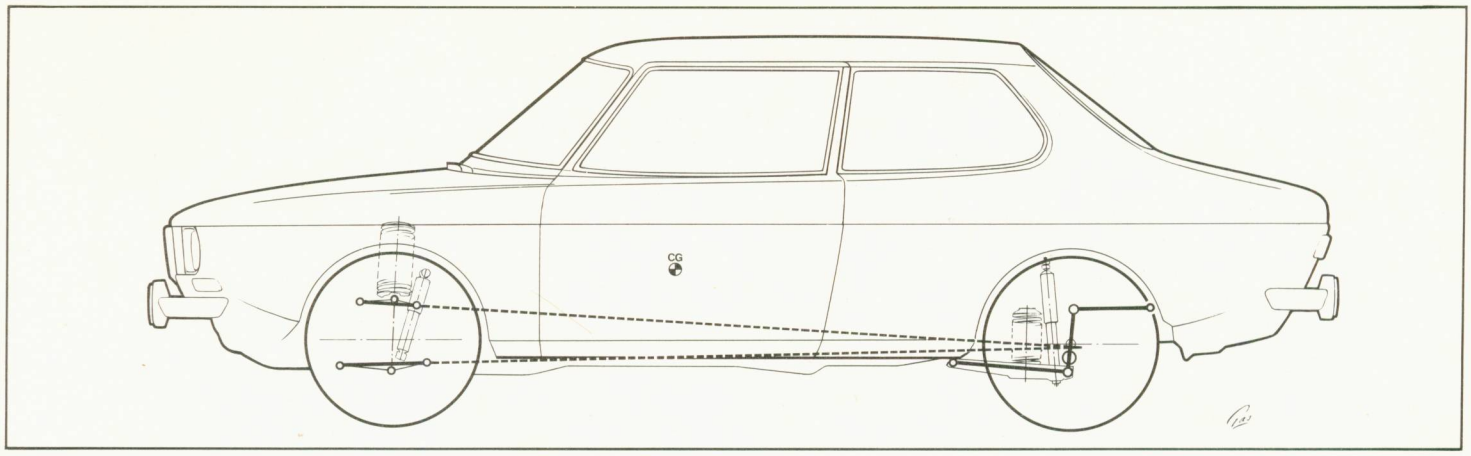
Permanently lubricated drive joints

Each drive shaft has two joints (69), the outer of Rzeppa constant-velocity type. Both inner and outer joints are permanently lubricated and normally need no maintenance.

Alternator

SAAB 99 has a 12 volt electrical system with a battery capacity of 60 amp. hours. It has an alternator that charges already at idling speeds, and has a maximum charging effect of 420 watts. The alternator allows the use of low beam headlights even at the slowest speeds without any risk for loss of charge in the battery.

The 1 hp starting motor, together with the alternator and the large battery, guarantee sure cold weather starts.



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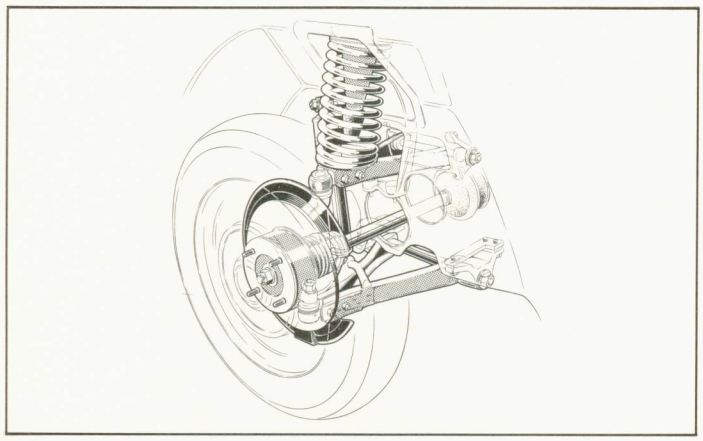

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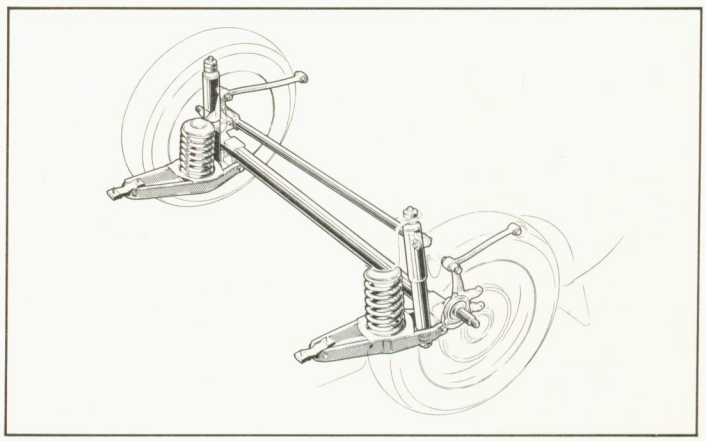

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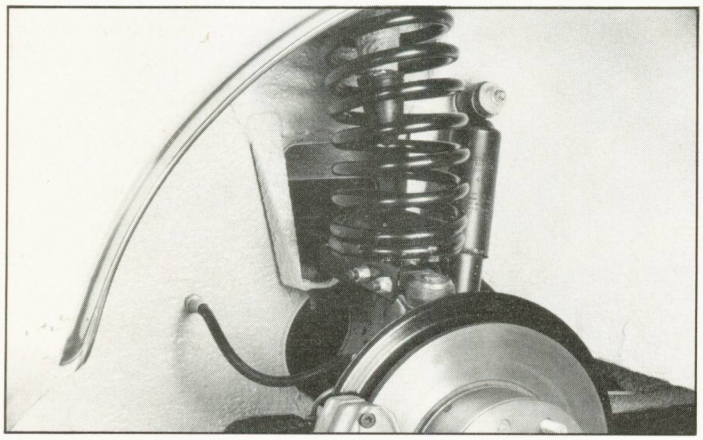

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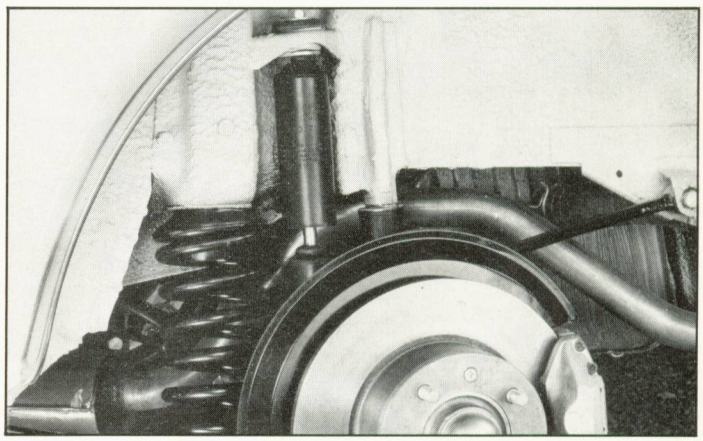

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SUSPENSION

Smooth ride, anti-dive suspension geometry

Through long, practical experiments, springs and shock absorbers in SAAB 99 have become perfectly balanced with the result that the car can offer an excellent combination of smooth riding comfort and fine road holding.

The suspension geometry (68) is such that the car has almost no nose dive tendencies at hard braking, or rear end dive tendencies at hard accelerating.

Wide track and low unsprung weight

All wheels have coil springs and double acting tubular shock absorbers (69, 70). The swinging arms in the front end suspension mechanism have rubber mountings, and the steering knuckle housings are attached with permanently lubricated ball joints. The entire front end assembly is completely maintenance free.

The unusually wide track (54.7 inches front, 55.1 inches rear), in combination with the widely placed springs and shock absorbers, also helps give the car good sideways stability.

There are no separate stabilizers, which allows for a more comfortable suspension, and less risk for wheel spin during hard driving on sharp corners.

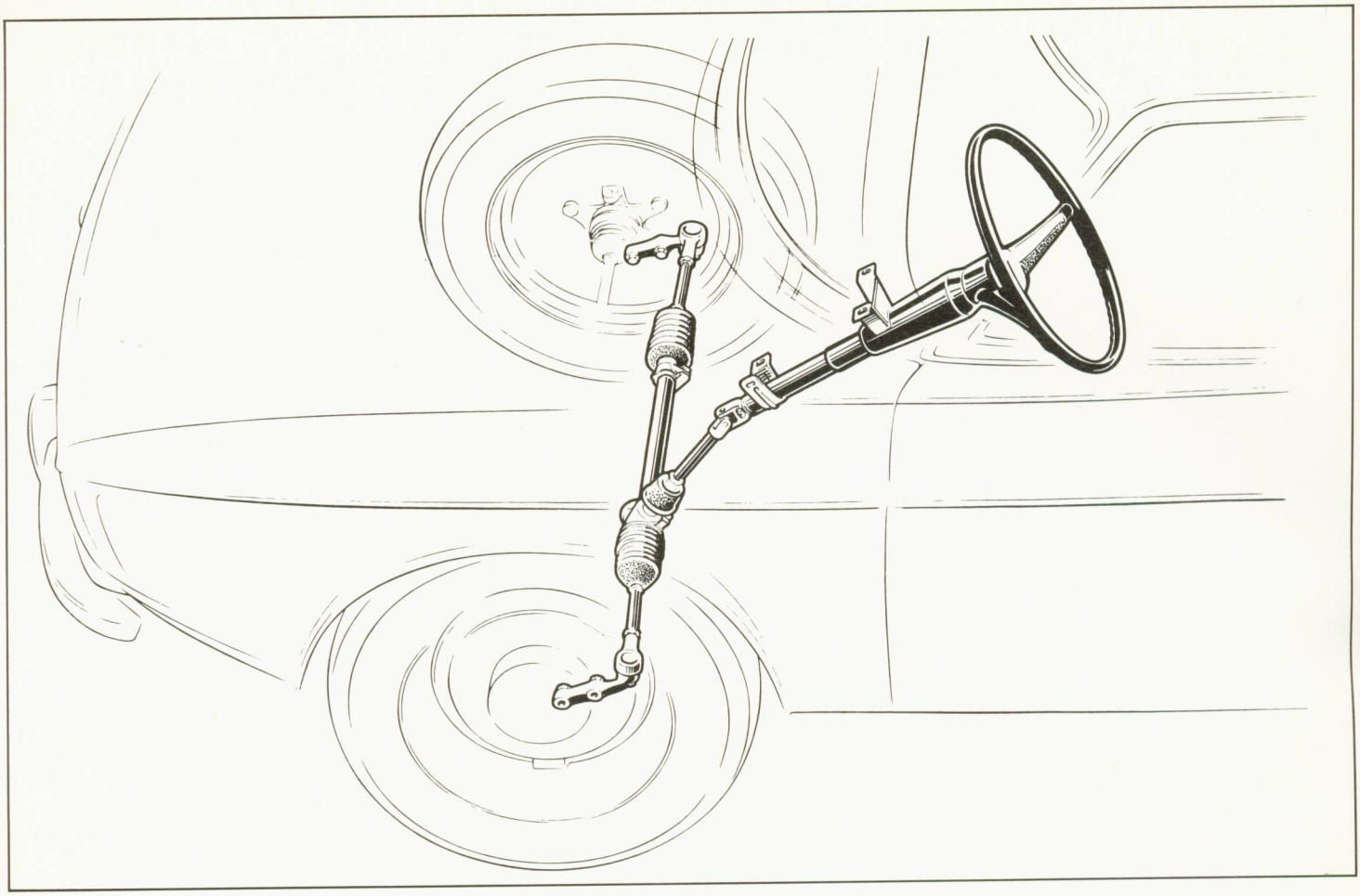
The rear wheels are constantly parallel, thanks to the light but stable tubular rear axle. There are no changes in the track width or variances in the wheel angles, as can happen, for instance, in cars with pendulum axles. The front wheel drive also avoids any problems with heavy drive train components that can increase the unsprung weight and lessen the road holding ability on rough roads.

Well steered rear axle

The rear wheels are mounted on a straight axle controlled vertically by two pairs of arms, one forward and one backward (70). The coil springs are set between the lower arms and the seats in the body, along with the shock absorbers. The rearward directed upper arms absorb, together with the lower arms, all longitudinal forces, as well as the brake forces. Sideward forces are absorbed through a long cross beam. The rear axle is thus very well directed, so well, as a matter of fact, that the car's road holding abilities are hardly affected at all by changes in load inside the car.

Built for radials

The SAAB 99 suspension is designed for the use of radial ply tires, and the swing arm rubber mountings are balanced to insulate against the vibrations that the radial tires can cause when driving on rough stone pavements or over joints in concrete roads. Radial ply tires size 155 SR 15" are part of the standard equipment.



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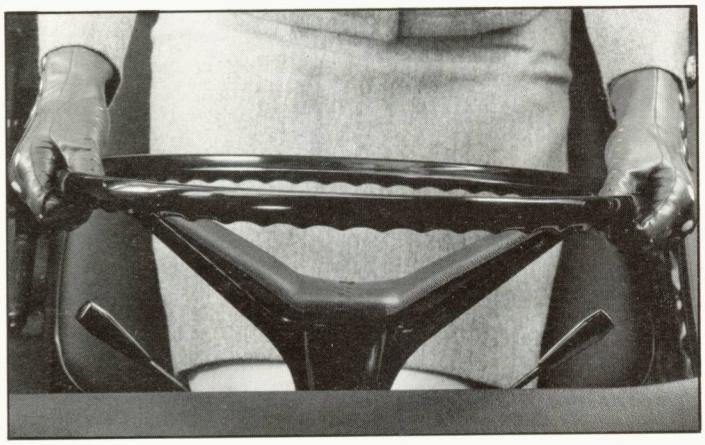

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STEERING

Proven rack-and-pinion type

The rack-and-pinion steering is basically of the same time tested type as that used on other SAAB models. It is a stable design that works without any slippage and with minimal swing action of its own.

This allows SAAB 99 to react quickly and precisely to any steering wheel turns. The steering ratio is such that the car is easy to park, even in narrow spaces. Full front wheel swing requires 3½ full turns of the steering wheel.
The turning diameter — 33.8 feet — also helps make SAAB 99 a very easy car to park.

Steering for stability

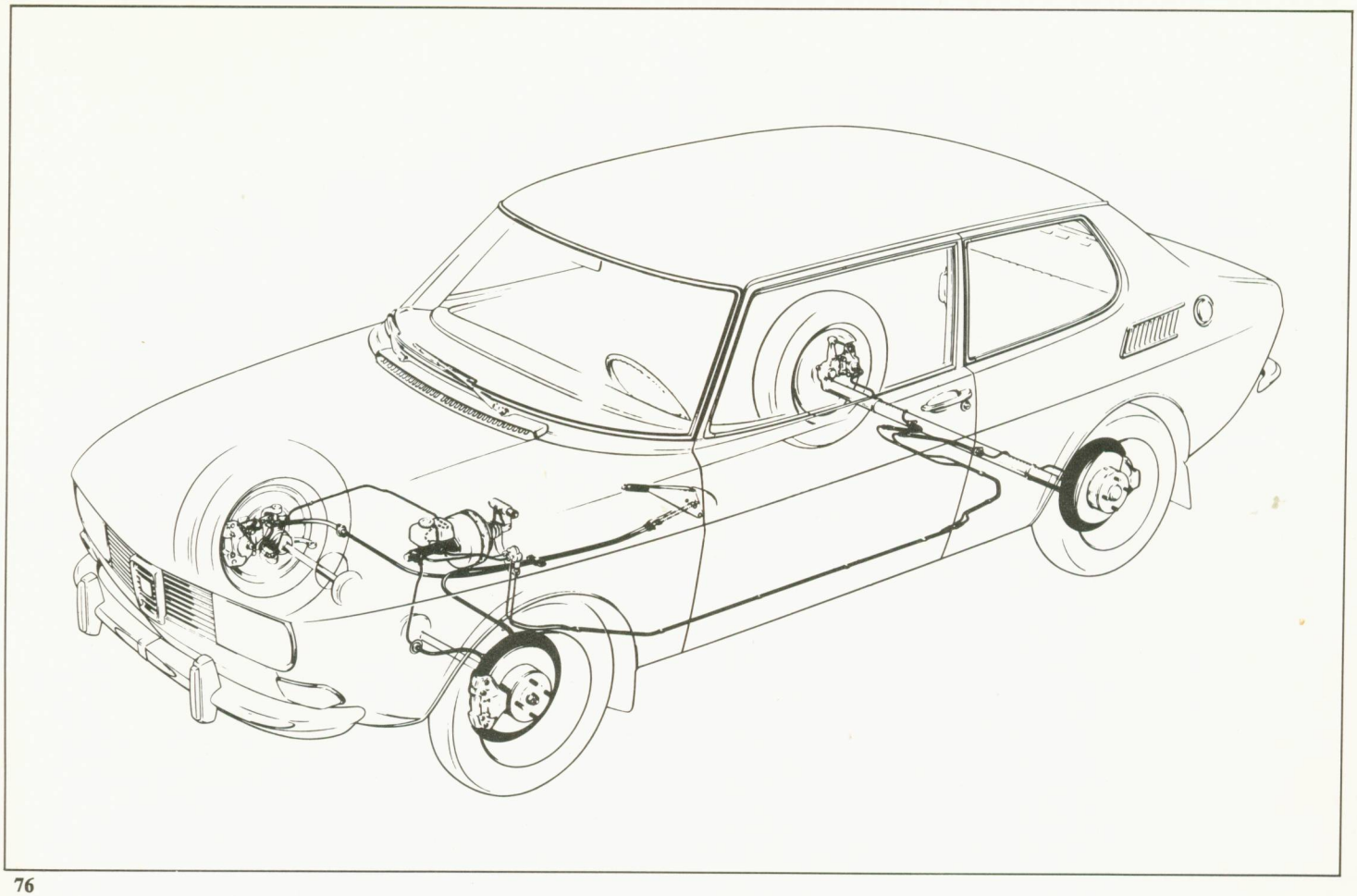
Many factors contribute to make the steering characteristics relatively unaffected by outer forces. The tie rods are placed so that the car's springing action will only very slightly affect the steering motions. The driver does not have to compensate for any roughness in the road. The car will stay on course. Throws from road obstacles will not be transmitted to the steering wheel, thanks to the fact that the steering assembly is securely rubber mounted to the body. The front end design is also such that changes in acceleration will not affect the steering. A brake line failure and resulting loss of brake power on two wheels will also leave the steering almost unaffected, and the car will remain on the right course.

SAAB 99 is slightly understeered through the entire speed range. The car is designed with this characteristic, as this helps the stability and lessens the risk for rear wheel skids. The understeering, which is very moderate, has been attained through, among other details, the weight distribution.

The 99's extremely good sidewind stability is also, to some extent, a result of the fact that about 61 percent of the car's total weight is carried by the front wheels. Another contributing factor is the body styling.

Safety steering column

The steering gear is placed far back in the engine compartment and is well protected by the engine, so that a very heavy front-end impact is required to dislocate it. Two joints in the steering column (73) are designed to give at heavy impact, and the shaft itself is mounted so that it will break away from the body fastenings and bend out of the way of harm. In addition, the column is telescopic and can be compressed at an impact. This construction, together with the safety type steering wheel (74, 75), is designed to give the ultimate in protection for the driver in case of an accident.



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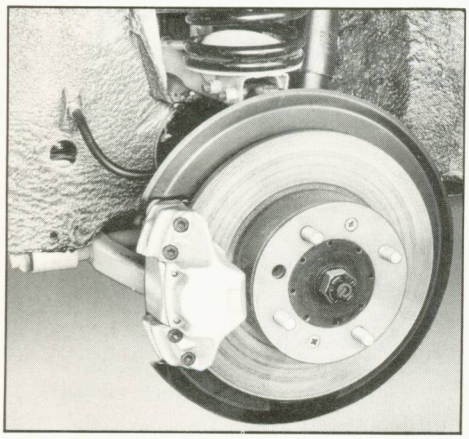

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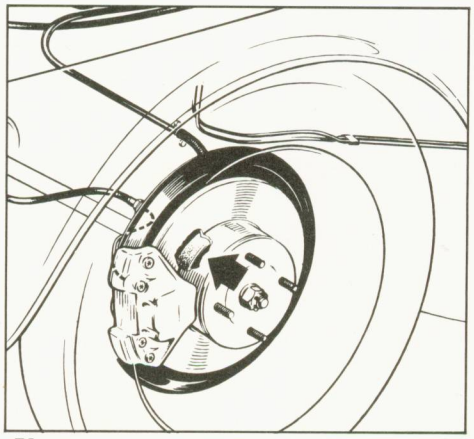

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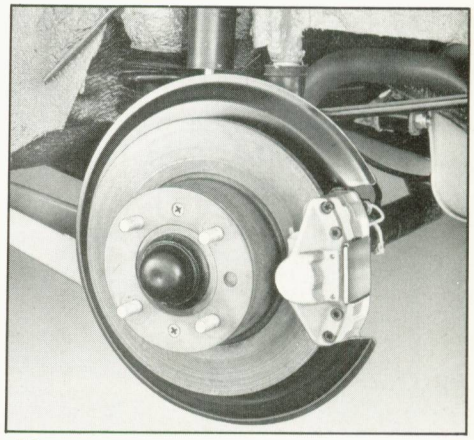

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BRAKES

Disc brakes all around

SAAB 99 has disc brakes on all four wheels. The braking action is always even with power directly in proportion to pedal pressure. To reach full brake power without too heavy pedal pressure, SAAB 99 has a direct acting power assist of the vacuum type. For safety reasons, the power assist action is rather moderate so that full braking action can be attained even if the power assist for some reason would be out of commission. The brakes have extra heat resistant pads to minimize fade, even under the worst braking conditions, such as mountainous driving with full vacation loads.

Front wheel handbrake

SAAB 99 has a handbrake that works on the front wheels. The front end action means that the handbrake can give up to 50% of the total foot brake system effect, and it can thus be used as a very effective emergency brake. And, since the front wheels are braked while the rear wheels roll freely, the risk for sideway skids has been eliminated, also in this instance. The front wheel action of the handbrake (76, 78) is also a great assist to a driver using the handbrake to start the car on a hill.

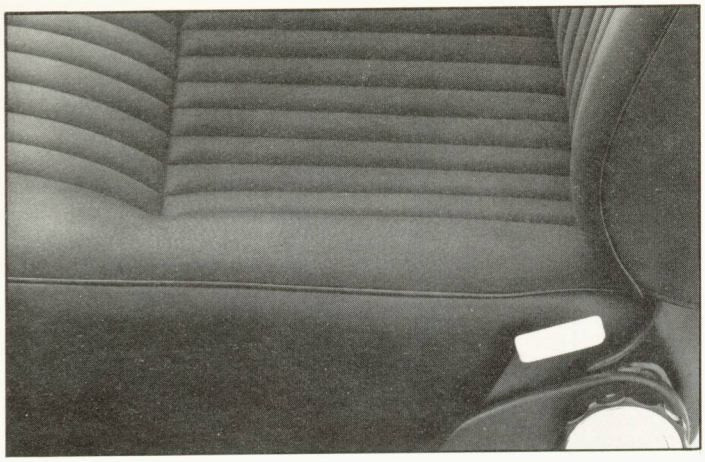
The handbrake works through separate drums.

Simple effect distribution

The distribution of brake power between front and rear wheels has been attained in the simplest way possible: The front wheels (77) have larger brake cylinders than the rear wheels. The more heavily loaded front wheels receive 80% of the total braking power — the lighter loaded rear wheels get the remaining 20%. This has minimized the risk for "fish tailing" or worse, rear end skids, even at panic stops on curves.

Dual diagonal system

The hydraulic foot brake system is divided diagonally into two circuits (76), according to the same principle used on other SAAB cars since 1964 — and hailed by experts the world over. One circuit works on the right front wheel and the left rear wheel, the other on the other two wheels. This division means that 50% of the normal braking action always remains (plus the handbrake), should one of the circuits fail. As mentioned earlier, a warning light on the dash shows if one of the circuits is out of order. Another warning light shows that the handbrake is pulled. The hydraulic brake lines are corrosion resistant with a coating of zink, and are located well inside the car, at the upper edge of the rocker panel.



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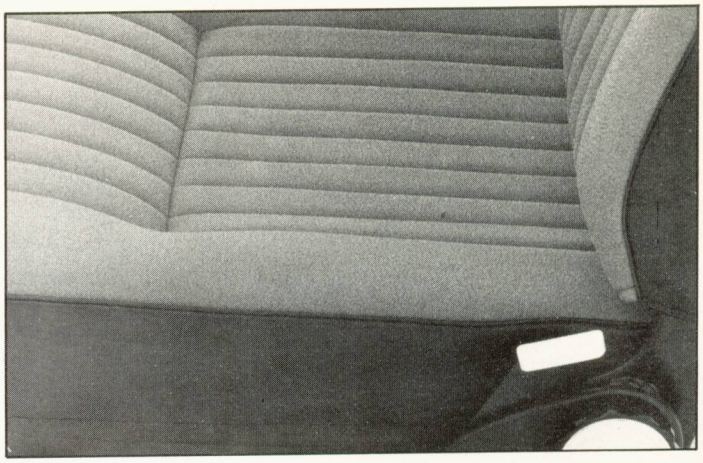

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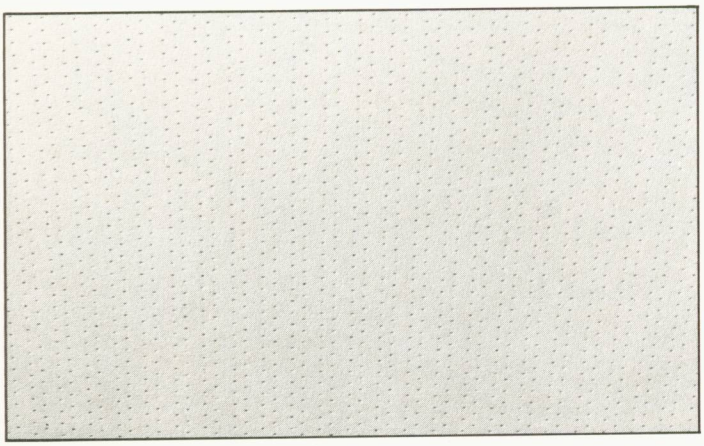

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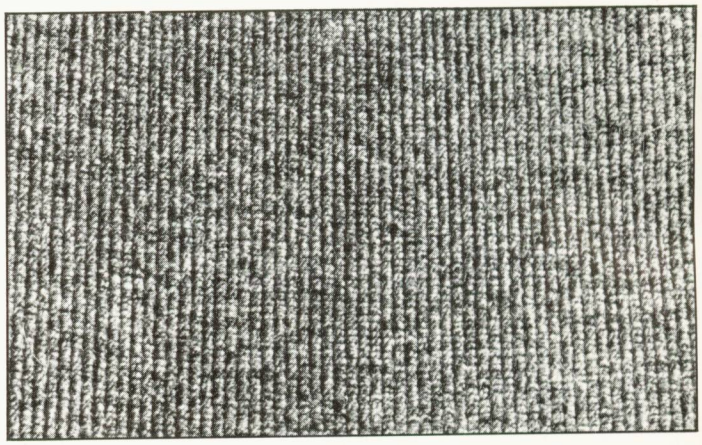

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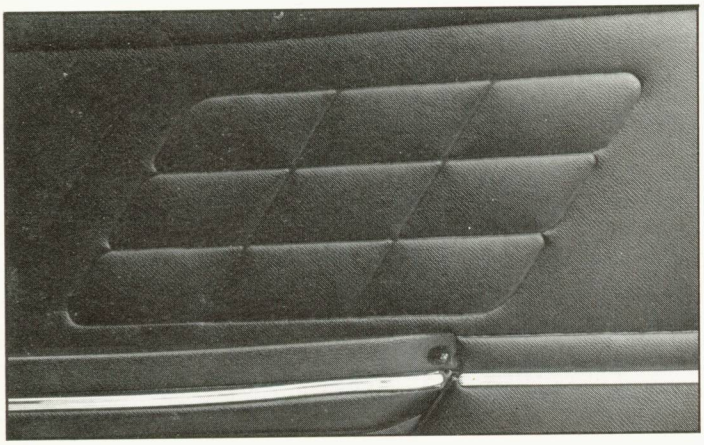


84

Exterior color	*Seat upholstery*
White	Black nylon tricot
Silversand	Black nylon tricot
Red	Black nylon tricot
Green	Black nylon tricot
Blue	Blue nylon tricot
Black	Grey nylon/velour velvet

COLORS AND UPHOLSTERIES

Exterior colors

The 1969 SAAB 99 is offered in six colors: White, Silversand ivory, Hussar blue, Sea green, Red and Black.

Interior colors and materials

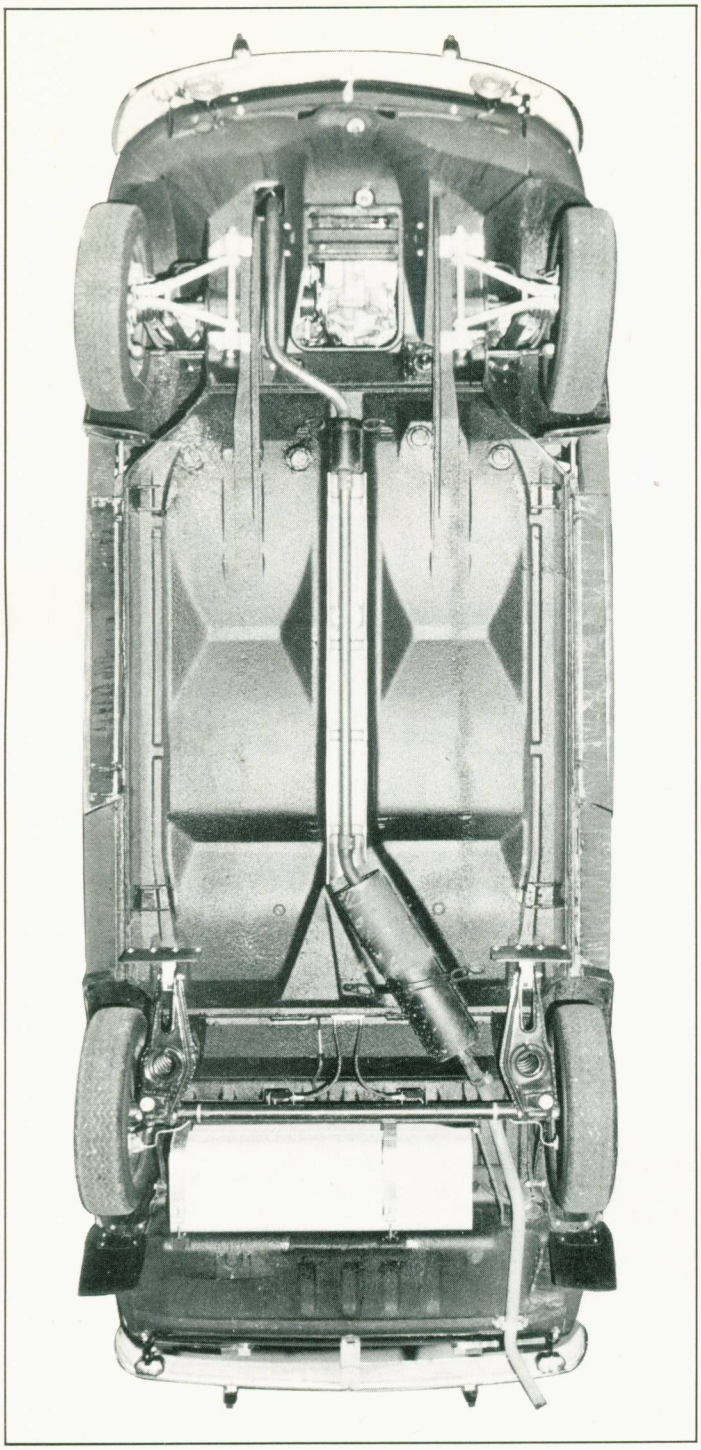
The interior of the SAAB 99 is a combination of wide, comfortable seats and tasteful decor.

All seats are covered with soft, durable nylon tricot (80) or, as in the black car, nylon velour velvet (81) — both materials cool in the summer, warm in the winter. Edgings are of black vinyl, the same both rugged and elegant material as is also used on door and rear side panels (84).

The seat paddings consist of foam rubber and foam plastics and are shaped to keep the riders firmly in place. The backrest paddings are shaped to offer both side support and lower back support.

The ceiling is covered with light grey vinyl (82).

Wall-to-wall textile carpeting, in grey, (83) is standard on all SAAB 99s.



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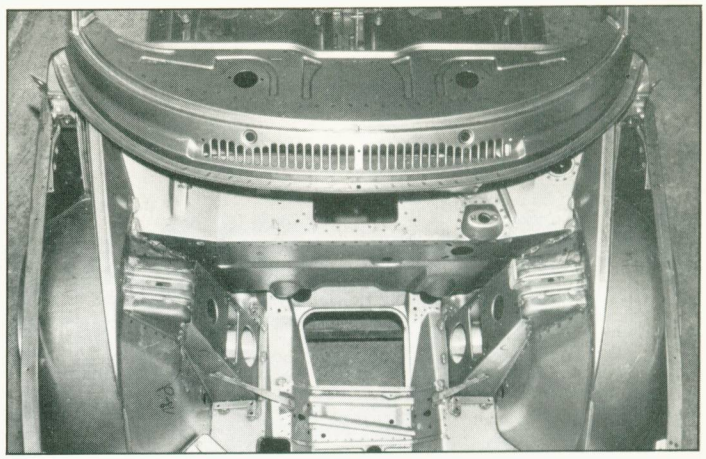

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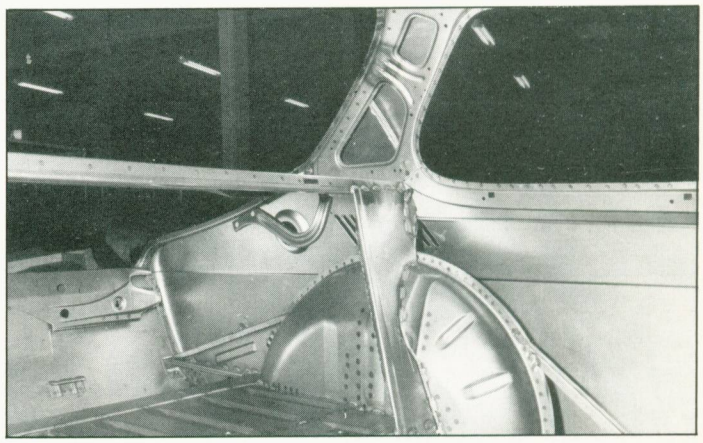

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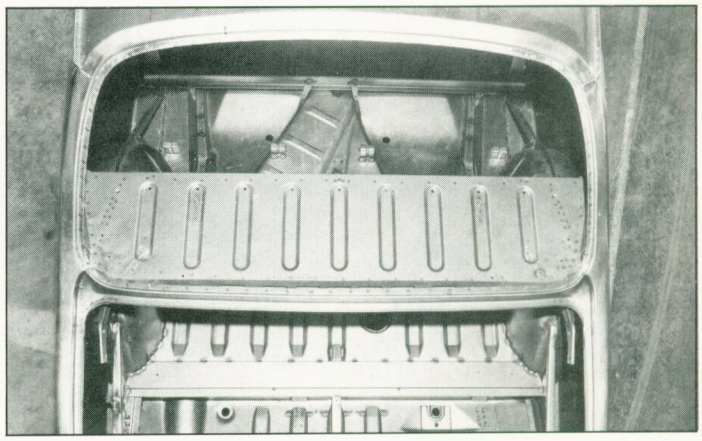

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BODY

Strong and light

SAAB 99 has a two-door sedan body, consisting of a unit-welded self supporting body shell including fenders, and engine hood, doors and trunk lid.

To combine maximum strength and low weight, the body shell is assembled of only a few separate parts — body sides and fenders, for example, are formed in one piece. Many parts, among them the floor board, are built in so-called multiple welding jigs, which assure an even and high quality to all welds.

The passenger space is protected by a stable "cage" of beams. It consists of strong side beams, extra supports around the roof line, and windshield supports of double profile construction, one inside the other. Both the front and rear portions of the body are designed to absorb impacts from both front and rear.

Rust resistant

The floor board of the SAAB 99 is designed so that all welds are pulled towards the sides and not located at the lowest points of the car. This keeps moisture from collecting in the welding joints. Immediately before welding primer is applied to all parts that cannot later be reached for rust proofing. The completed body surfaces are phosphate pre-treated so that the surfaces become somewhat "roughed up" and thus will better hold the paint coats. After this has been done, the welding seams are covered with a special glue and the entire body given its primer coat. Then comes the next step in the rust-proofing process: undercoating is applied automatically and without air, at a pressure of 250 atm. (3,500 psi.)

All cavities are sprayed with aluminum pigment rust proofing. When the body is later dried in the heating chambers, the undercoating is "burnt" onto all bottom surfaces (85), and the rust proofing seeps into cracks and corners through capillary action. Finally, the body is painted with several coats of synthetic lacquer.

The construction and the choice of materials has also been done with an eye towards rust and corrosion resistance. Hubcaps and bumpers are made of stainless steel, as are the air outlets on the body sides. The front grille is manufactured of eloxized corrosion resistant aluminum, and decorations around the wheel wells are made of plastic with chrome foil.

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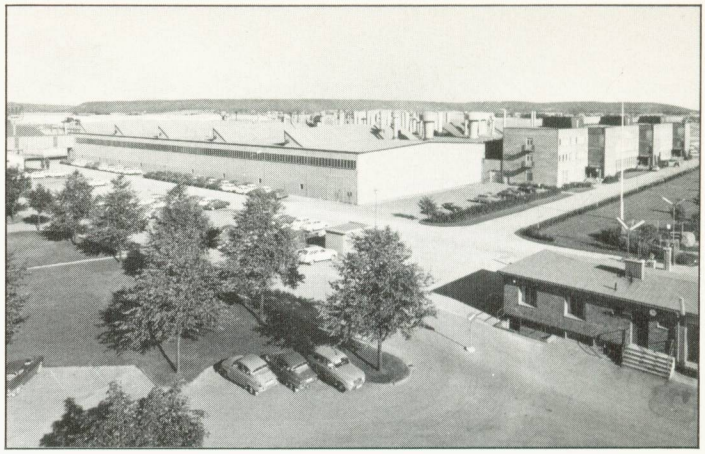

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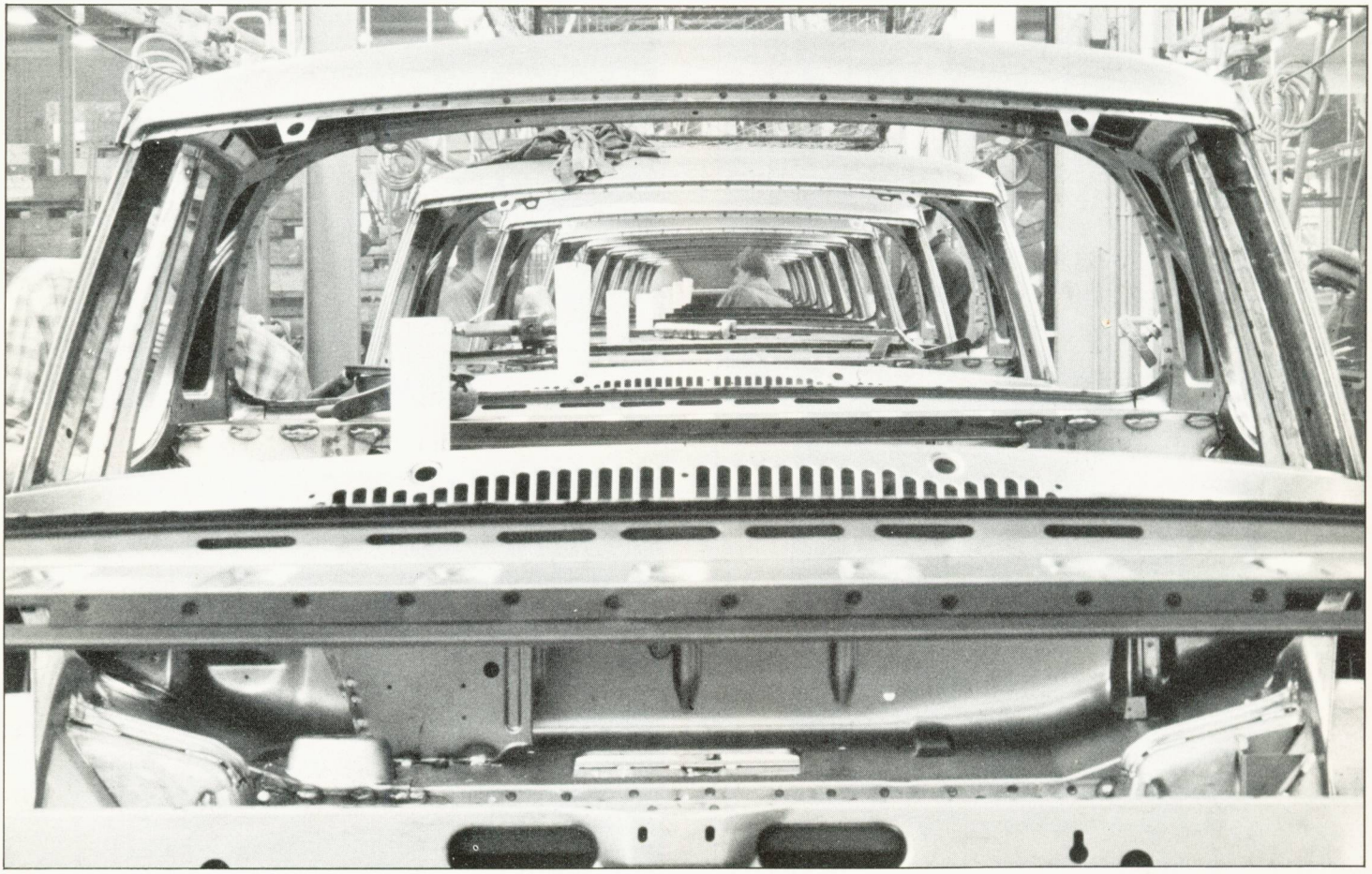

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SAAB — or SAAB AKTIEBOLAG — as the official corporate name reads, started its manufacture of passenger cars in 1949, and delivered its first cars to Swedish customers in early 1950. Since that time, the company's automobile production has been steadily increasing — from about 1,200 units in 1950 to well over 50,000 in 1968. The production schedule for 1969 is as high as 69,000 cars.

About 50 percent of the total production is exported, with the majority of the vehicles being shipped to the United States, Great Britain, and the Scandinavian countries.

The automobile division is headquartered in Trollhättan, Sweden, and the total factory space in the automobile plants (90, 91) now measures some 1,560 000 square feet. The total SAAB corporation space at present, including factories and offices, measures some 5.5 million square feet.

But SAAB is a lot of other things besides automobiles. The corporation has since before the beginning of World War II played a leading role in the Swedish defense industry, and its importance today is greater than ever. SAAB, since 1962, is the prime supplier for the largest defense undertaking ever in Sweden — System 37, the Viggen all-purpose jet aircraft program.

In the aviation division, production at present is primarily concentrated on the SAAB 35 Draken of which the Swedish Air Force has ordered some 500 units for delivery through 1971. Besides the Draken, SAAB at present also manufactures the SAAB 105, a two-seater training aircraft, for which the Swedish Air Force has placed orders for about 150. Both the Draken and the 105 jets are also available in export versions.

Another major field of operations for SAAB is military and civilian electronic products. The main items are computers, some for military use (airborne units for the SAAB-built aircraft) and many for scientific and commercial industrial applications.

The total number of employees in all SAAB divisions, was 14,251 in 1967, of whom 6,754 worked at the main offices and plants in Linköping, Sweden (89).

On the research and development side, SAAB employs some 2,500 scientists and engineers, making SAAB the largest organization in Sweden for technical research and development.

TECHNICAL DETAILS, SAAB 99, 1969

Dimensions and Weights

Overall length: 171.4 in.
Overall width: 66.0 in.
Height, unladen, approx.: 57 in.
Ground clearance (at curb weight + driver), approx.: 6.7 in.
Front track: 54.7 in.
Rear track: 55.1 in.
Wheelbase: 97.4 in.
Front overhang: 34.0 in.
Turning radius (between curbs), approx.: 16.9 ft.
Frontal area: 20.7 sq. ft.
Curb weight (with tools, oil, fuel and water), approx.: 2,350 lb.
Max. weight, fully loaded: 3,308 lb.
Weight distribution at curb weight: 61 % front, 39 % rear.
Number of seats: 5
Trunk space (SAE rating): 12.3 cu. ft.
Hill climbing ability (with driver only):
2nd gear 31 %
3rd gear 20 %
4th gear 13.5 %

Engine

The engine is tilted 45° to the right and mounted in unit with the clutch, the transmission and the differential.
Number of cylinders: 4.
Cylinder arrangement: in line.
Bore: 3.29 in. (83.5 mm).
Stroke: 3.07 in. (78.0 mm).
Piston displacement: 104.3 cu. in. (1,709 cc.)
Compression ratio: 8.8 to 1.
Maximum power, SAE: 87 b.h.p. at 5,500 r.p.m.
Maximum power, DIN: 80 PS at 5,200 r.p.m.
Specific power: 50.8 b.h.p/litre (SAE)
Maximum torque, SAE: 98 lb. ft. at 3,000 r.p.m.
Maximum torque, DIN: 94 lb. ft. at 3,000 r.p.m.
Camshaft: Overhead, with chain drive.
Valves: Overhead, operated by the camshaft via light depressors.
Number of main bearings: 5
Number of camshaft bearings: 5
Firing order: 1-3-4-2.
Engine lubricant capacity: 3.7 US qts.

Fuel system

Fuel tank capacity: 12.6 US gals.
Carburetor: Zenith-Stromberg 175 CD, horizontal-flow type.
Fuel pump: AC Delco, mechanical.
Minimum fuel octane rating: 96.

Cooling system

Water-cooling.
Cooling system capacity: 8.5 US qts.
Radiator: cross-flow type, with expansion tank.
The cooling fan is electrically driven and thermostat controlled. (It operates only when required).

Transmission

Front-wheel drive.
Free wheel device.
The clutch is mounted at the front end of the engine and connected to the gearbox via an intermediate gear.
Clutch type: single dry plate, with resilient hub.
Number of gears: 4 forward, 1 reverse.
Clutch operation: hydraulic.
All forward gears synchronized.
Gear ratios, engine to driving wheels:
1st gear 13.6 to 1;
2nd gear 8.6 to 1;
3rd gear 5.8 to 1;
4th gear 4.0 to 1;
reverse gear 13.6 to 1.
Intermediate gear ratio: 0.95 to 1.
Final drive ratio: 4.22 to 1.
Theoretical speed at 1,000 engine r.p.m.:
1st gear 5.2 m.p.h.;
2nd gear 8.3 m.p.h.;
3rd gear 12.2 m.p.h.;
4th gear 17.7 m.p.h.;
reverse gear 5.2 m.p.h.
Gearbox and differential lubricant capacity: 3.2 US qts.

Brakes

Disc brakes front and rear, ATE make.
Vacuum-operated servo assistance.
The hydraulic system is diagonally divided into two independent circuits, each acting on one front wheel and opposite rear wheel.
The foot brake system is calibrated to work with about 80 percent of its total power on the front wheels.
Brake disc diameter: 10.6 in.
Friction area on front wheel discs: 186 sq. in.
Friction area on rear wheel discs: 165 sq. in.
Total swept braking surface: 351 sq. in.
Handbrake: mechanically acting on the front wheels through separate drums.

Suspension

Independent front wheel suspension, transverse wishbones.
Tubular, rigid rear axle with two pairs of longitudinal arms and a transverse (Panhard-) beam.
Coil springs and double-acting telescopic shock absorbers front and rear.

Steering

Steering gear: rack and pinion type.
Ratio, steering wheel to road wheels: 19.1 to 1.
Number of steering wheel turns, lock to lock: 3 1/3.
Divided and collapsible safety type steering column.

Wheels and tires

15 in. wide base special ledge steel disc wheels.
Rims: 4.5 in. J SL×15 in.
Tires: Tubeless radial ply, 155×SR 15 in
Normal tire pressure, front and rear:
At light load 21 psi.
At full load 24 psi.

Electrical system

Voltage: 12.
Battery capacity: 60 Ah.
Starting motor: 1 b.h.p.
Generator: Alternator type.
Max. battery charge/voltage: 35 amp./14 volt.
Number of fuses: 12 (8 amp).

Body

Self-supporting all-steel body with two doors.
The rear seat bench and seat back can be folded to provide a steel-covered loading deck extending from the regular trunk and giving a total luggage floor length of about 69 inches.
Individual front seats with reclinable backs (12°—40° in sitting position, 45°—68° in resting position). Safety seat back locks.
Both front seats individually adjustable in height and inclination.
High capacity heating and ventilation system with separate outlets to the rear compartment (can be operated by the rear seat passengers) and to the rear window.
Inside dimensions: Shoulder room front 53.2 in.; shoulder room rear 55.2 in.; elbow room rear 59.9 in.; front head room 38.4 in.; rear head room 37.7 in.
The body is thoroughly treated against corrosion. Undercoating applied before final painting.

SAAB

SAAB AKTIEBOLAG Works Trollhättan/Export Department Linköping, Sweden

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STÅLHAMMAR/ZETTERQVIST