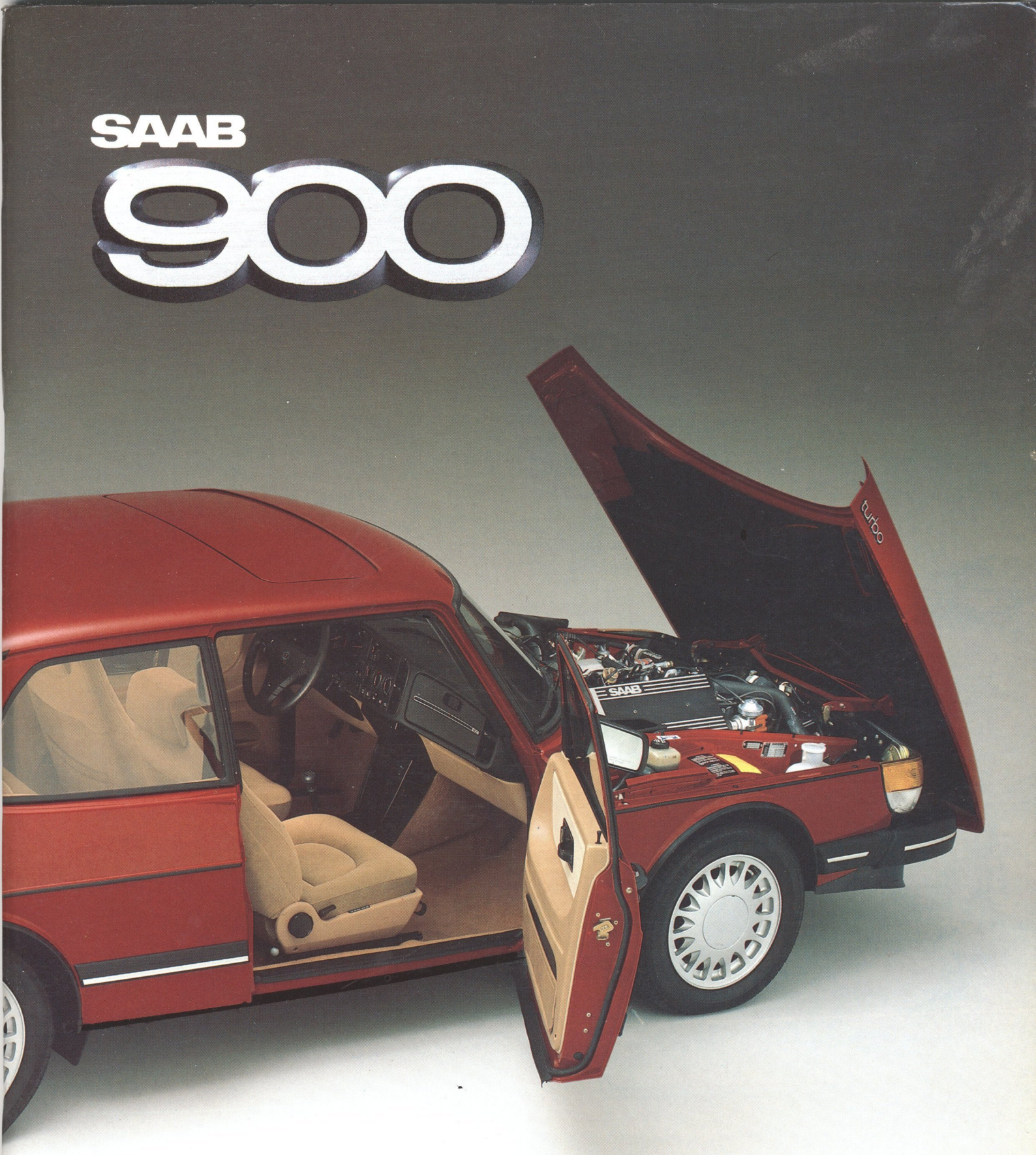
SAAB

900



Engineering features

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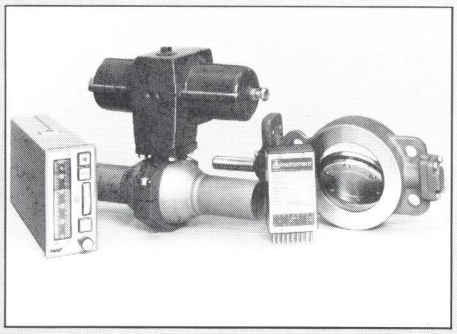


The Saab-Scania Group is organized into three product-oriented divisions: the Scania Division, the Saab Car Division and the Aerospace Division. The Group also includes the subsidiaries Saab-Scania Enertech AB and Saab-Scania Combitech AB.

The Saab-Scania Group has about 40,000 employees and is one of Scandinavia's largest industrial groups. Few companies in the world have a product range which is so firmly focused on advanced transportation technology.

Trucks

Scania trucks are manufactured in gross vehicle weights above 16 tons and are available in more than 250 chassis versions. Apart from being produced in Sweden, they are also manufactured in the Company's own factories in the Netherlands, the Argentine and Brazil. About 17,500 Scania trucks were manufactured in 1983, and nine out of every ten of them were sold outside Sweden. Scania vehicles thus comprise 15% of the total world exports of heavy trucks.

Buses

Scania buses are marketed as integral construction models for city traffic and as chassis for city traffic as well as long distance duties. The silent and economical Scania buses are manufactured in Sweden, the Netherlands, Argentina, Brazil, and the Unites States. About 1,700 buses were sold in 1983, and nine out of ten of them went to customers outside Sweden.

Cars

Saab cars are well-equipped family cars, characterized by good performance, high comfort and safety. The engine range is very modern and includes turbocharged engines. Saab cars are manufactured in Sweden and Finland. More than 95,000 cars were sold in 1983 and 70 per cent of these were exported.

Passenger aircraft

A new 35-seat turboprop aircraft, known as the Saab-Fairchild 340, is being developed, manufactured and marketed by Saab-Scania in collaboration with Fairchild Industries of the U.S.A. Customers had already signed options for more than 100 aircraft when the first prototype rolled out of the factory in 1982.

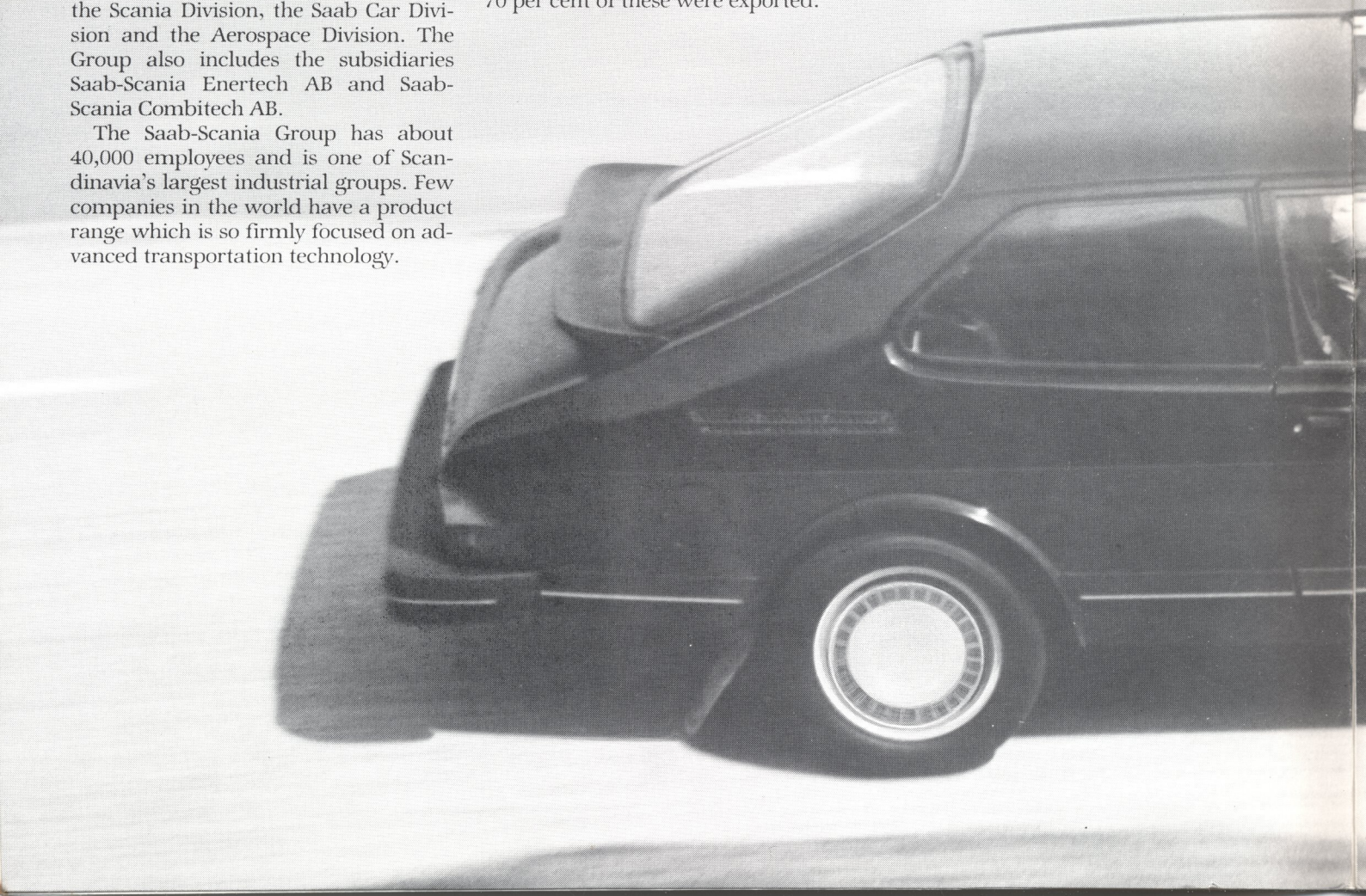
Military aircraft

Saab-Scania is one of Western Europe's leading manufactures of military aircraft. The product range includes the Saab 37 Viggen – a multi-mission interceptor, attack and reconnaissance aircraft, with performance on a par with the most modern weapons systems in the world.

A new multi-mission aircraft designated the JAS 39 Gripen and designed for interception, attack and reconnaissance is now being developed for the Swedish Air Force.

Outer space activities

Saab-Scania is participating in a number of projects within the framework of the European space collaboration. Saab-Scania is building Sweden's first satellite, the Viking – which is to be placed into orbit in 1985. One of the tasks of the satellite will be research into



the aurora borealis. Two years later, the Tele-X communication satellite will be placed into orbit.

Other products

Other products, including those for transport, control and supervision of industrial processes and for heating are also manufactured within the Saab-Scania Group. The products include Parca and CTC central heating boilers, heat exchangers, oil burners, Scania diesel engines for industrial and marine applications, NAF valves and brake products and Saab level measuring equipment for tankers and production equipment for sawmills.

Saab innovations

Saab cars have been manufactured since the late 1940s. Over the years, Saab has introduced many new and unconventional design features and items of equipment. Many of these have become pioneering innovations in automotive engineering. Some examples are listed below:

The diagonally split, dual-circuit brake system was introduced as far back as 1963. The energy-absorbing and "self-repairing" bumpers were fitted to the 1972 models and were the first bumpers capable of withstanding a barrier collision from 5 mph in accordance with American safety standards. In the same year, Saab was the first in the world to introduce the electrically heated driver's seat.

In 1973 Saab was first to launch the hatchback idea in a practical version which was later adopted by increasing numbers of competitors.

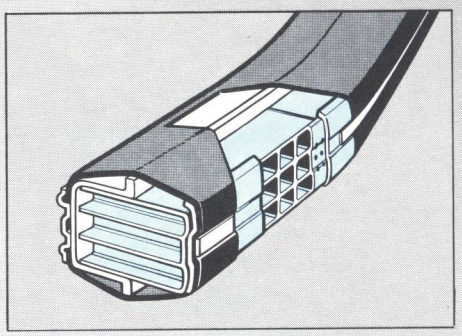
Saab has also been a pioneer in the important field of occupant safety in cars. Seat belts were fitted as standard in Saab cars ten years before they became mandatory in Sweden.

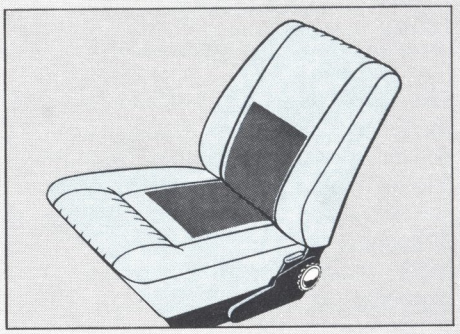
Another Saab innovation is the roof lining of molded glass fiber. The lining provides excellent impact protection, and at the same time offers effective heat insulation and noise isolation.

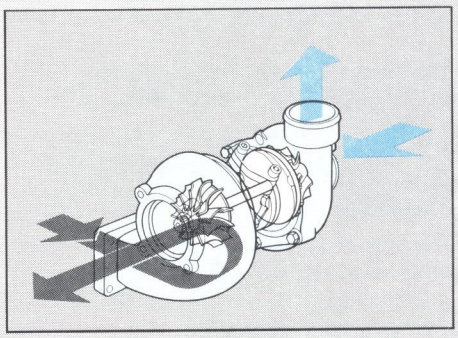
In 1977, one of the most widely discussed new features in the automotive field was the Saab turbocharged engine. A few years later the APC system was launched – a device which enables the turbo engine to adjust itself automatically to the octane number or quality of the fuel used.

The introduction of the 16-valve engine represents a further step in the development towards more efficient internal combustion engines.

Over the years, many of the Saab innovations have been awarded prizes by organizations and the motoring press. These include a gold medal from the Swedish Automobile Association, an "Oscar" from the German periodical "Hobby", the "Don Safety Trophy" – Great Britain's most coveted annual distinction for car safety – and 1972 "Car of the Year" award from the Swedish periodical "Teknikens Värld". And in 1978, the head of the Saab-Scania Engine Department was awarded the "Guldkuggen" (the Golden Gear wheel) prize for his outstanding efforts in the development of the Saab turbocharged engine. "Guldkuggen" is Sweden's foremost annual award for inventors.

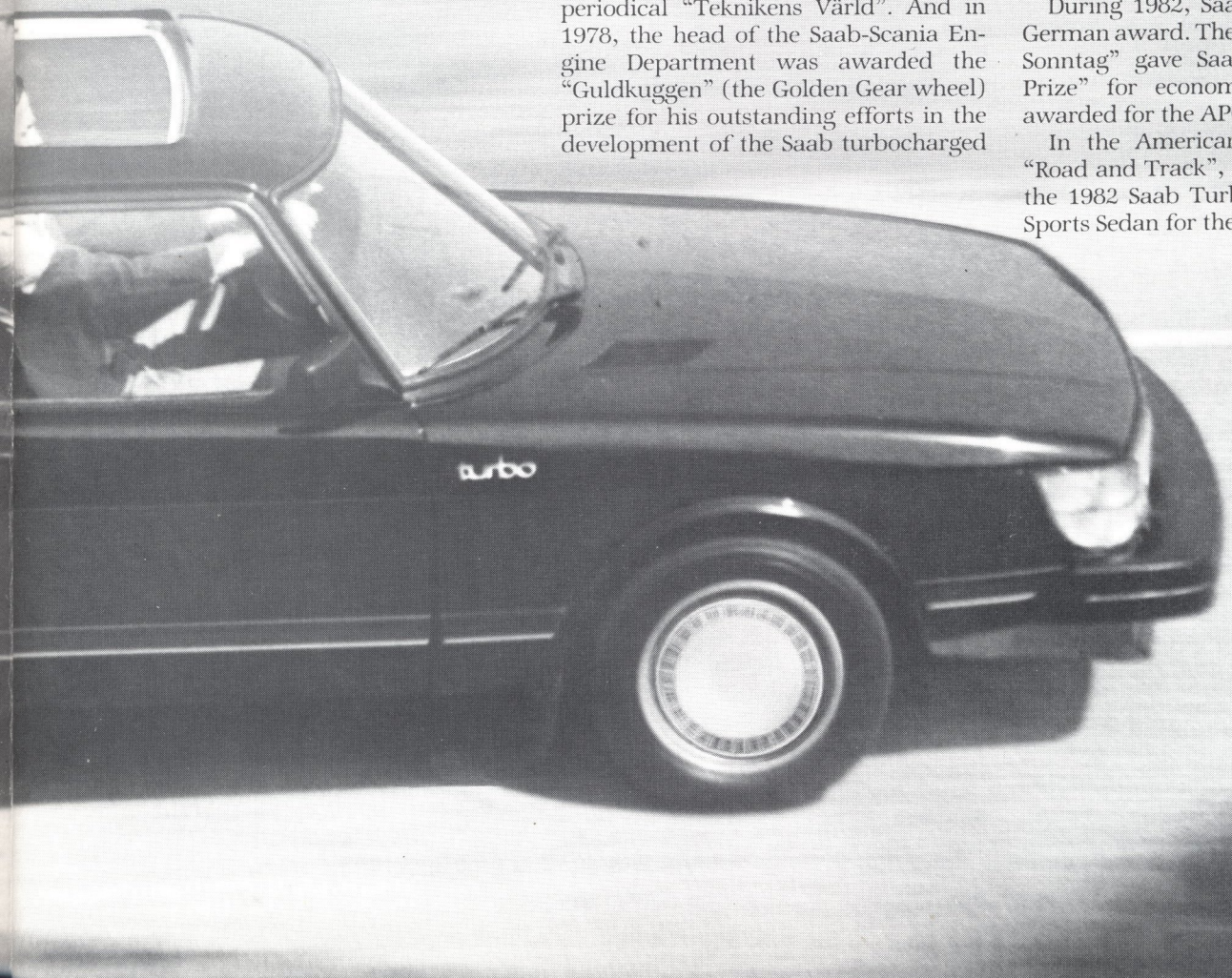






During 1982, Saab gained a coveted German award. The periodical "Bild am Sonntag" gave Saab the "Great 1982 Prize" for economy. The prize was awarded for the APC system.

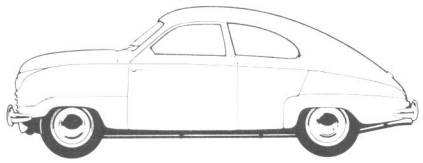
In the American motoring journal "Road and Track", the editors awarded the 1982 Saab Turbo the title of "Best Sports Sedan for the Eighties".



From the 92 to the 900

All cars can trace their origins to a simple and logical basic principle which is then developed further and gains substance in a step-by-step procedure. This is equally true of the Formula I racing car as it is of the conventional family car. The Saab is no exception. But the differences begin to emerge from this point onwards ...

The automotive history of Saab began as the Second World War was approaching its end. Svenska Aeroplan AB (SAAB) started looking around for an alternative and a supplement to its production of military aircraft. The choice fell on a more "down to earth" means of transportation – the car.



The Saab 92 developed into the Saab 96

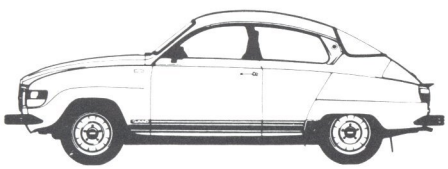
The car that took shape during the mid-1940s was christened the Saab 92. Initial specifications for the 92 were as follows:

- It was to have a good aerodynamic shape. Tests proved that the coefficient of drag was as low as 0.32 – an extremely low value, even compared to the most advanced cars produced today.
- It was to be light weight. Heavy cars are not economical, since they must be powered by an engine which is also heavy.
- It was to have front-wheel drive. Since front-wheel drive, good weight distribution and good roadholding are intimately interrelated.
- It was to be safe for all occupants.

The end result was an entirely new type of steel body which, in spite of its low weight, was stronger than most of its contemporaries. Front-wheel drive also contributed to safety, since the 92 was almost unbeatable among standard cars in negotiating winding and unpaved or snow-covered roads.

Right from the early days, safety considerations determined that the location of the fuel tank should be at the rear of the car, between the rear wheels.

The steering gear was mounted far back in the engine compartment, in order to reduce the risk of loss of steering in the event of a collision, and was of collapsible design.



These design features may seem trivial and self-evident today. But almost all of them were new and unknown when Saab presented them more than 30 years ago.

The very first Saab model proved to offer an excellent basis for further development and refinement. It was correctly conceived right from the start. Over the years, the outward appearance was given an occasional slight "face-lift", although without altering the fundamental characteristics. The last direct descendant of the 1950 Saab 92 was the

1980 model of the Saab 96. So the basic design survived for a period of 30 years – something of a record in the automotive field.

Innumerable rally victories

The first Saab model was launched on the market in 1950. In the same year, a Saab won its first victory in a rally. This victory was followed by many more. The most famous of these are the Monte Carlo Rally won by Erik Carlsson in 1962 and 1963, and the three straight victories in the British RAC Rally in 1960, 1961 and 1962. Saab thus became one of the world's most widely acclaimed rally cars, and this was largely responsible for Saab's sales success, particularly in export markets.

Over the years, various drivers gained major successes in Saab 96 and Saab 99 cars in some of the world's toughest rallies. More than one thousand victories have been recorded, including about one hundred in major international events. Apart from the RAC and Monte Carlo Rallies, Saab cars took the checkered flag in the Scottish Rally, the Acropolis Rally, the Bergslags Rally, the Norwegian Winter Rally, the Finnish Snow Rally, the Thousand Lakes' Rally and the Swedish Rally to mention but a few of the more famous events.

The Saab 99

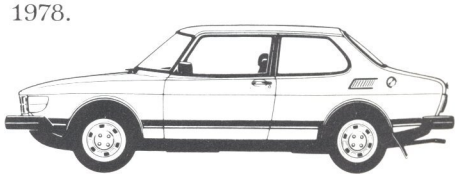
When the Saab 99 was launched in 1967 after ten years of development work, it was met with high expectations. The first reports were very favorable, and this continued over the years. A few examples:

"We wish more cars were like Saabs. Particularly like their cunning Coupé..." (Wheels, Australia).

"If we were to choose the Car of the Year for 1975, the title would presumably go to the Saab 99..." (Motorsports Weekly, U.S.A.).

The Swedish periodical "Teknikens Värld" awarded the Saab 99 the title of "Car of the Year" for 1972. And the Saab gained Great Britain's fore-most annual award for road safety – the Don Safety Trophy. This was the first time the prize went to a non-British car.

The basic design of the 1967 Saab 99 provided an excellent base for further development and became the "breeding ground" for a long succession of innovations. 1973 saw the launching of the "Combi Coupe", a hatchback model that combined the best features of the sedan, station wagon and coupé. The 99 also became the base for an entirely new and larger model, the Saab 900. The first Saab 900 models were presented in 1978.



Body and interior

"The saloon's styling is pleasing enough in the flesh and the boot space is truly enormous. One is immediately impressed by Saab's excellent seats, the overall levels of finish, and the sure stability the cars possess once you are on the road..."

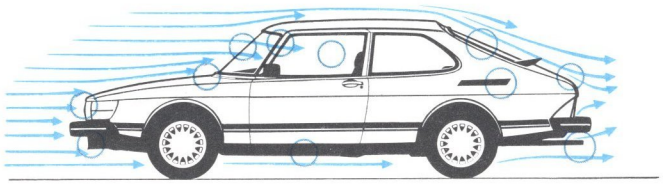
(AUTOCAR, GREAT BRITAIN)

The objective of the designer entrusted with the task of styling a product is obviously to produce an attractive end result. But the task of a car designer is not confined to producing elegant bodies and interiors. He must take into account a long succession of factors, many of which may appear to be incompatible.

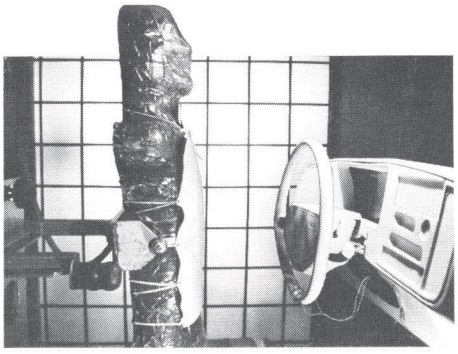
A car must be comfortable, practical and safe. It is these characteristics that determine the shape and appearance. But it should preferably not be apparent that the end product is a compromise, and one of the designer's duties is thus to find the styling which gives the car its own unmistakable identity.

The designer must also adjust the basic shape of the car and any projecting components, so that the air flow will be deflected with the minimum possible turbulence. Sharp edges and protrusions give rise to turbulence and increase the fuel consumption of the car. This is illustrated by the fact that, at as low a road speed as 35 mph, more energy is necessary to overcome the air resistance (drag) than to overcome the mechanical losses in the drive train and tires. Tests on cars in the same size and performance class as the Saab 900 demonstrate that, by reducing the drag coefficient from 0.5 to 0.4, the fuel consumption on mixed cycle driving will be reduced by about 10%. The drag coefficient thus can be regarded as a "quality factor" for the shape of the car.

But the problem is not confined to achieving the lowest possible drag in the direction of travel. Consideration must



also be given to the effect of the optimization of shape on the road behavior and the directional stability – in a blustery cross-wind, for instance. At high speeds, the flow of air over the car may give rise to significant lifting forces (lift) at the rear wheels, which will impair the roadholding. If the car is also to have

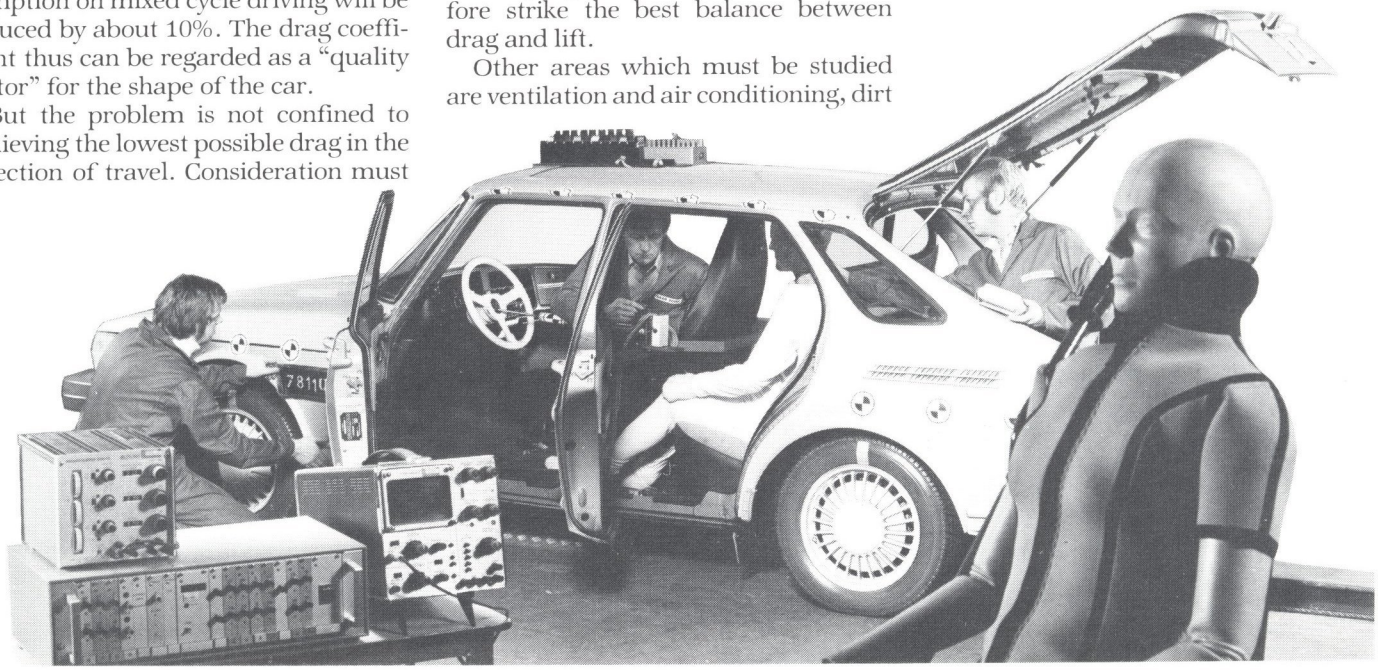


good directional stability at high speeds and in strong cross-winds, the loads on the wheels must be sufficiently and consistently high. The designers must therefore strike the best balance between drag and lift.

Other areas which must be studied are ventilation and air conditioning, dirt deposits on the windows, size and location of the cooling air intake, turbulence and spread of the exhaust gases behind the car.

During a series of full-scale windtunnel tests, Saab designers have gradually adjusted the basic design of the 900 body, in a step-by-step procedure, culminating in the present optimized shape. It was a compromise which struck the best possible balance between comfort, safety, appearance and low air resistance.

The cars of tomorrow will be the result of compromises to an even greater extent, in order to satisfy the demands which cannot readily be combined in any one car. Space, comfort and collision safety favor big cars. Our congested roads, economy and conservation of raw materials favor the small car. But roomy, safe and elegant cars can undoubtedly be built within limited external confines, as demonstrated by Saab with the 900 series.



Basic design: Body and interior

Seldom has a car as advanced as the Saab 900 gained acceptance on the market in so short a period of time. And seldom has a new car received such widespread acclaim from the press and motoring public.

Autosport in Canada wrote: "It is difficult to put into words the charm and fascination of this remarkable car. As a combination of performance, refinement, and fuel economy, it stands alone, and the integrity of its engineering and the quality of its finish are second to none. If you were to conclude from the above that this is just about the best motor car which is at present being made, anywhere, you wouldn't be far wrong."

When the largest German automotive magazine "Auto, Motor und Sport" arranged a referendum on the "World's best cars" in 1981, its readers voted the Saab 900 Turbo the undisputed winner in the category of imported cars up to 2.5 liters. The Saab 900 Turbo emerged a resounding winner in 1981, 1982, 1983 and 1984. In last year's enquiry, the Saab 900 gained 38% of all votes.

In 1982, the prestigous U.S. motoring journal, "Road & Track", gave its editors the assignment of selecting the 10 Best Cars for the Eighties. In the category "Best Sports Sedan", the team was unanimous in picking the Saab 900 Turbo as number one.

And the American motoring magazine "Car & Driver" summarized a Saab 900 test as follows: "If we had to pick one target at which to aim the sedan of tomorrow, this would be it..."

The "prototype for tomorrow" has been developed further in several respects since this summary was written. The engine, front suspension details, luggage compartment and interior have been modified. The car has become even more economical, comfortable and practical to drive and own.

To combine styling and utility under the pressure of strict technical and economic limitations is also a difficult task. But Saab designers are considered to have succeeded very well with the 900 series. The overall impression is not broken up by improvisations and "stuck-on extras." The Saab 900 is far more spacious inside than its outside would

The curved instrument panel, the colors and symbols on the instruments, the slope of the steering wheel and the locations of the pedals are the visible results of very extensive ergonomic studies and measurements. The driver can reach all of the controls without changing his driving position. And his eyes need never leave the road and the traffic.

The roof lining is molded glass fiber, covered with velour fabric. This Saab innovation, in addition to being impact-absorbing, provides noise and heat insulation.

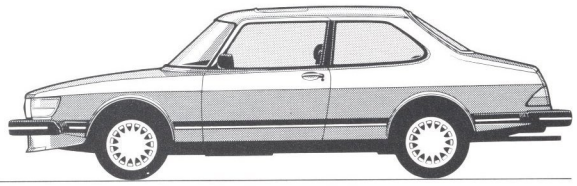
The luggage compartment is very large. On three-door models, the parcel shelf can either be raised for additional convenience during loading, or removed entirely and placed on the luggage compartment floor.

On all Saabs, the ordinary luggage space can be more than doubled by folding down the back seat.

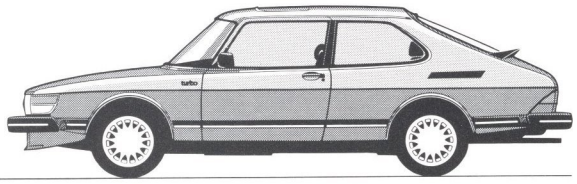
The spare wheel is located under a hatch in the floor. This space is also designed to accommodate tools, the jack and other accessories.

Bumpers of aluminum, impact resistant plastic and rubber protect the body in the event of minor collisions. The bumper is self-repairing to a certain extent – a patented Saab innovation.

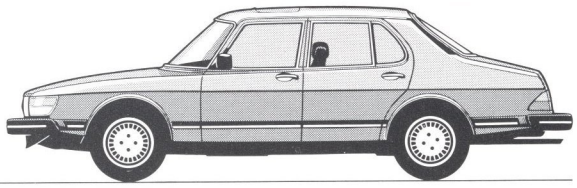
The back seat contains over 400 springs, and seating comfort is comparable with the most luxurious armchair.



Saab 900 2-door
Series: 900S/16 valves



Saab 900 3-door
Series: 900, 900S, and Turbo/16 valves



Saab 900 4-door
Series: 900, 900S, and Turbo/16 valves

suggest. The fact that functional considerations have been given priority is also responsible for the Saab 900 being an exceptionally well-planned car which is practical down to the smallest details.

The deeply-curved windshield and the absence of sharp bodywork corners which induce turbulence have jointly reduced the wind noise to an exceptionally low level.

A ridge forward of the sunroof and the curved windshield which deflects the air to the side both contribute to the wind noise being low, even when the car is driven at high speed with the sunroof open.

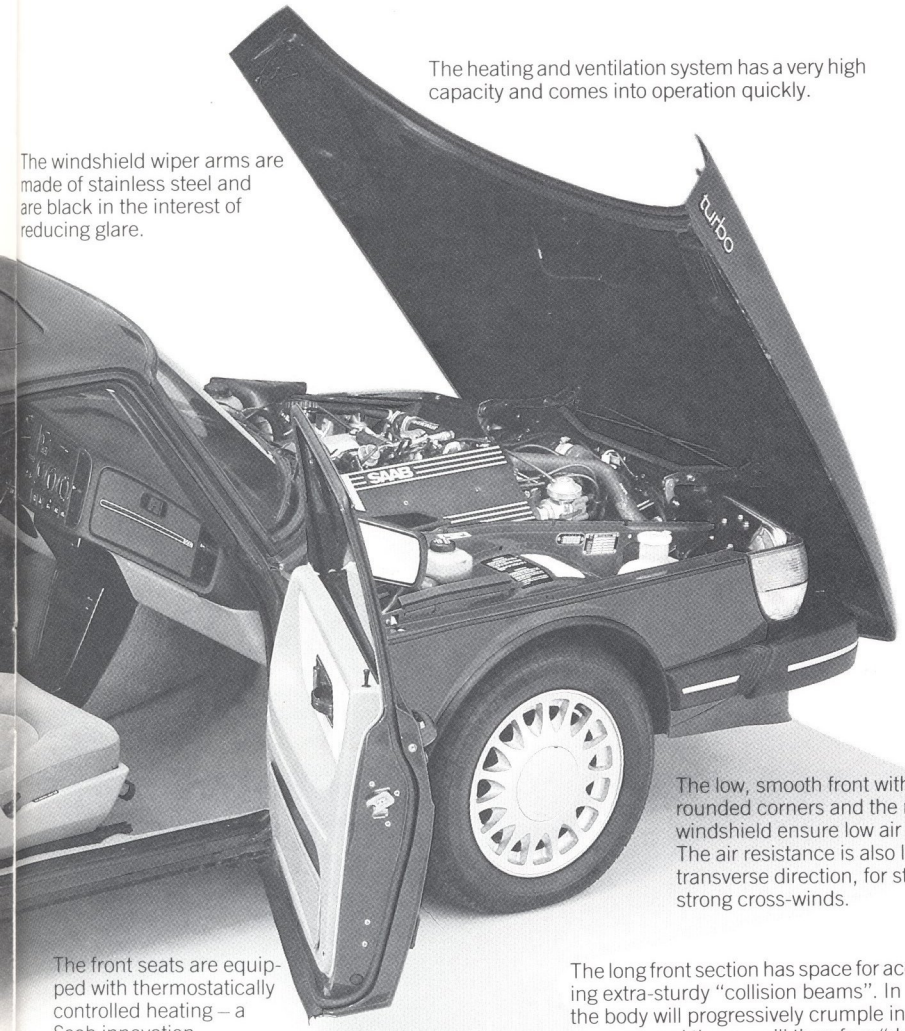
When Saab designed the hatchback model, one of the aims was that the rear window should be self-cleaning. Tests under the worst conceivable road conditions have demonstrated how successfully this aim has been achieved. The air flowing along the window forms a "curtain" between the glass and the dirt thrown up from the road.

In road racing, many car manufacturers have long experimented with spoilers fitted to the body to increase the top speed and improve the road behavior. The shape and location of the spoiler must be very carefully designed and tested. Fitting a spoiler as an afterthought will not automatically produce better roadholding.

The Saab 900 is fitted with a front spoiler which helps to reduce the fuel consumption. The 900 S two-door and all Turbo models are fitted with a large front spoiler. The Turbo three-door also has a rear spoiler as standard equipment.

The heating and ventilation system has a very high capacity and comes into operation quickly.

The windshield wiper arms are made of stainless steel and are black in the interest of reducing glare.



The low, smooth front with gently rounded corners and the rounded windshield ensure low air resistance. The air resistance is also low in a transverse direction, for stability in strong cross-winds.

The front seats are equipped with thermostatically controlled heating – a Saab innovation.

The long front section has space for accommodating extra-sturdy "collision beams". In a collision, the body will progressively crumple in a controlled manner, and the car will therefore "decelerate" more gently for the occupants.

The body is built up on a rugged steel cage and includes "crumple zones" at the front and rear. Sturdy steel members are welded into the doors. The design of the steering wheel and steering column are among the safest on the market. The entire interior is thoroughly padded at vital points.

Basic design

Chassis

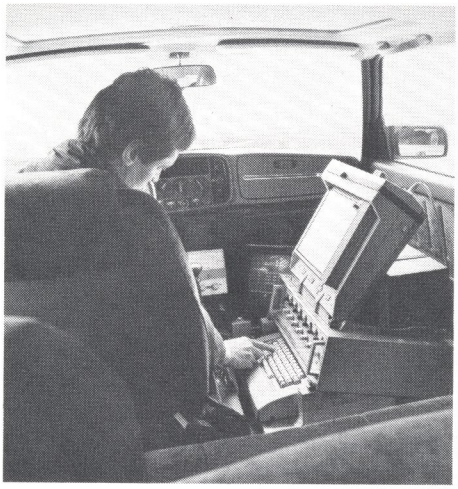
"...and the suspension's uncommon resilience also makes the Saab one of the best rough-road cars you can find... the Saab is simply amazing, absolutely poised on cratered surfaces that bring others to their knees... Highest marks for steering, brakes and driving position..."

(CAR AND DRIVER, U.S.A.)

The Saab 900 incorporates the same basic design features which have made earlier Saabs widely acclaimed for their roadholding properties. The basic elements include front-wheel drive, 60/40% weight distribution, lightweight rear axle, 15-inch wheels, rack-and-pinion steering and pivot-mounted springs.

Before the 900 series was launched in 1978, designers devoted massive hours to refining the chassis geometry. The design specification was severe. The Saab 900 was to have excellent directional stability and consistent behavior:

- on different types of road and on a variety of surfaces,
- when carrying a range of loads including maximum load,
- throughout the speed range,
- in cornering, regardless of whether the driver decelerates, accelerates or brakes the car.

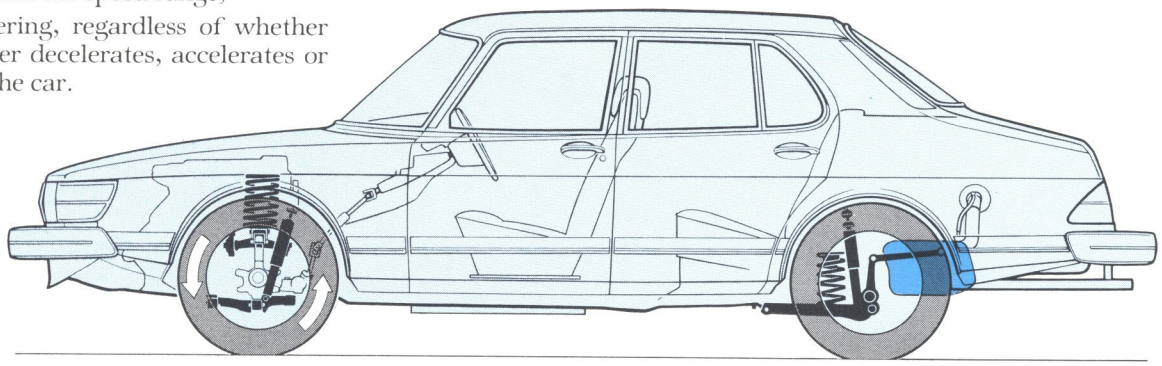


In recent years, the automotive industry has displayed a preference for smaller wheel sizes, but Saab has remained faithful to large wheels.

The latter offer greater ground clearance, better comfort and better traction on loose surfaces, such as on sand and snow. Larger wheels also provide space for larger brakes, and the brakes are easier to adjust.

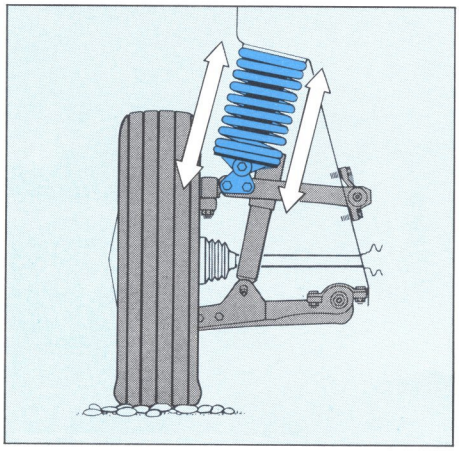
The Saab 900 has hub-centered wheels, which is the best system for true centering of the wheel to the hub.

The terms understeer, oversteer and neutral steering are often used when the road behavior of a car is discussed. When cornering at high speed, a car

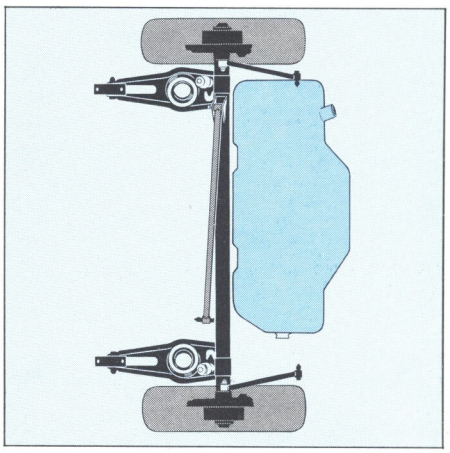


The geometry and bushings have been adjusted so that the rear axle exerts no self-steering effect when the car rolls and does not affect the lateral and braking forces. Computers and advanced electronic measuring equipment, designed by the Saab-Scania Aerospace and Computer Divisions, were used to optimize the chassis design. Conventional optical wheel-geometry measuring equipment was simply not accurate enough to satisfy the objectives of the engineers.

The front-wheel coil springs are pivot-mounted, an unusual refinement on standard cars. Owing to the pivot mounting, the springs always remain straight.



The rear axle is in the form of a lightweight, rigid tube which maintains the rear wheels parallel at all times. This eliminates track variations, a typical disadvantage of the split rear axle and independent suspension for the rear wheels. The fuel tank is located between the rear wheels, the safest place in the event of a collision.



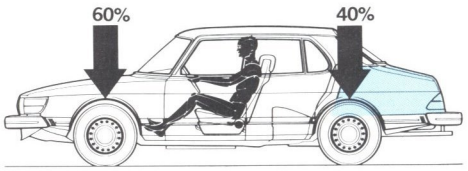
with understeer will run at a wider radius than that corresponding to the steering wheel displacement. In the same situation, a car with oversteer will run at a tighter radius, whereas a car with neutral steering has a behavior which lies between these two alternatives.

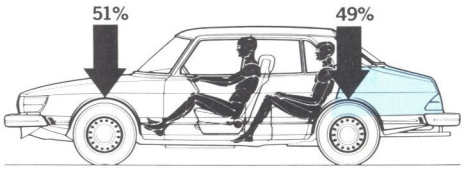
On a car with rear-wheel drive (which normally has a certain amount of understeer) the rear wheels cannot resist lateral forces to the same extent as the front wheels when the car is accelerating. High acceleration may therefore cause the normal understeer of the car to change to oversteer. The car may then be difficult to maneuver, particularly on a slippery surface.

On cars with front-wheel drive, the rear wheels maintain the directional stability of the car, since they are not subjected to driving forces. On the Saab 900, the rear axle, weight distribution and design of the brakes also contribute to the rear wheels being capable of withstanding relatively high lateral forces, even during braking. The Saab 900 normally has a certain amount of understeer and retains this characteristic, even under extreme conditions.

When carrying the driver and full tank of fuel, the approximate weight distribution of the Saab 900 is 60% on the front wheels and 40% on the rear wheels. Fully laden, the distribution changes to 51/49%. The Saab 900 thus still has a slight amount of understeer and has consistent behavior, with good directional stability.

As opposed to this, a car with a curb weight distribution of, say, 54% on the front wheels and 46% on the rear wheels will have the reverse distribution when fully laden. The road behavior and characteristics of the car will therefore change – from understeer to oversteer. This may be risky on a slippery surface.





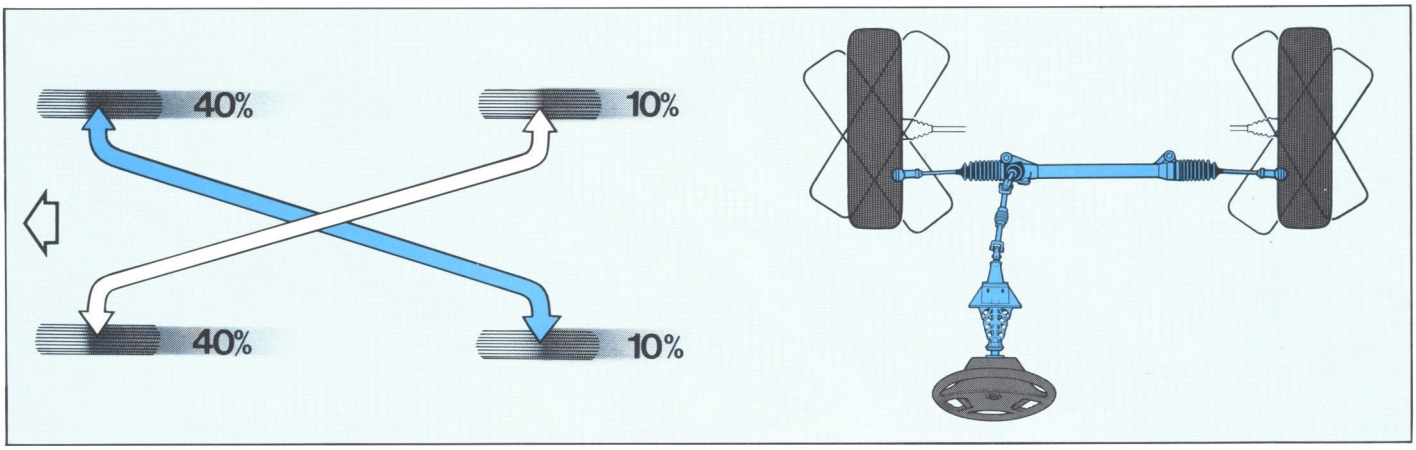
The Saab 900 has disc brakes all round, to ensure the shortest possible braking distance and consistent braking characteristics on all wheels, even under extreme conditions. The handbrake acts on the front-wheel discs.

When the brakes are applied, the loading on the front wheels increases. As a result, the harder the brakes are applied, the higher should be the braking effort exerted on the front wheels in relation to the rear wheels. The Saab brake system is designed so that the braking effort distribution on gentle braking or on a slippery surface is about 70% on the front wheels and 30% at the rear. On heavy braking on dry roadways, the distribution changes to 80/20%.

The Saab 900 has a diagonally split, dual-circuit brake system. As a result, half of the braking effort will still be available, even if one of the circuits should fail.

A good steering system must be easy to operate, although without giving rise to "wander". It must have no backlash and must provide a good "feel of the road". It must not transmit shocks to the steering wheel when the car runs over irregularities in the road surface. Finally, the steering wheel travel must not be affected by movement of the suspension springs.

The Saab 900 has rack-and-pinion steering. This system has no backlash and does not require periodic maintenance. (On the other hand, a worm-and-pinion steering mechanism requires periodic adjustments to eliminate the backlash.)



The Saab engines

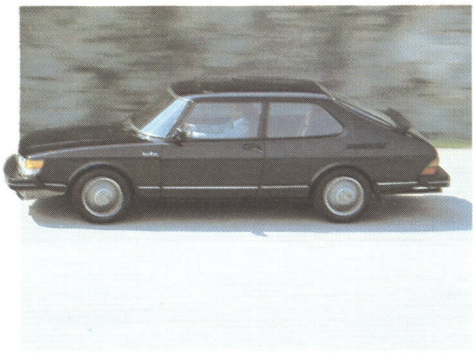
"...starts promptly and warms quickly from cold, idles steadily in traffic, revs sweetly to high revs when required, and can cruise without boom periods on the motorway at virtually any speed up to and including its maximum..."

(MOTOR, GREAT BRITAIN, ABOUT THE 900 TURBO)

All Saab 900 models are powered by a liquid-cooled, four-cylinder in-line engine which, with the clutch, gearbox and differential, forms a compact unit of minimum weight and bulk.

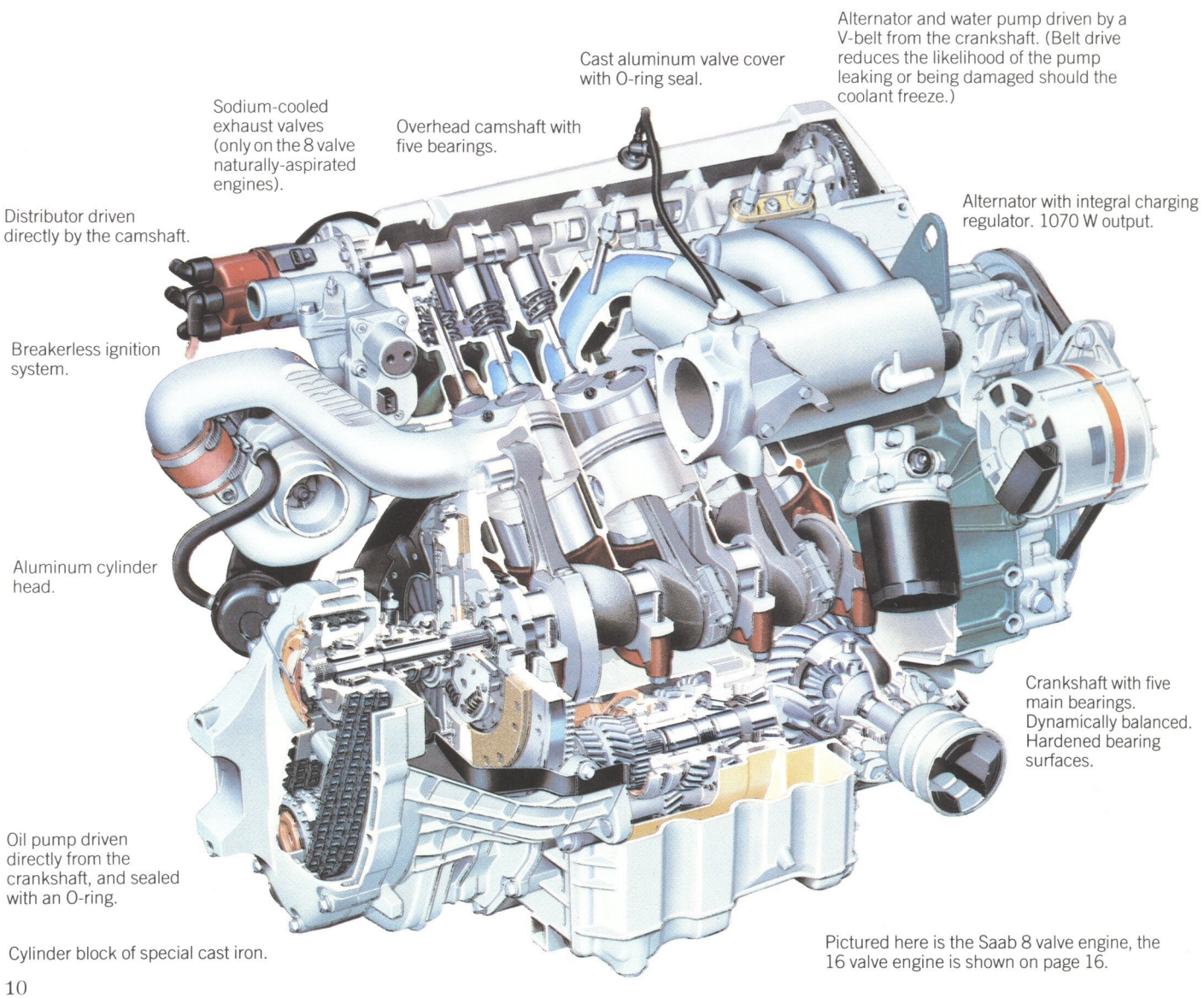
The arrangement of the inlet and exhaust tracts on opposite sides of the cylinder block has given the designers scope for optimizing the cooling of the cylinder head at high engine speeds along with the breathing characteristics.

The stroke of the pistons also determines the speed at which an engine can run. In the Saab engine, the stroke is only 3.07 in, and the average piston speeds and inertia forces are moderate even at high engine speeds. This is another reason why the Saab 900 can easily maintain high cruising speeds.



The engine has an overhead camshaft and the valves are therefore operated directly, without push-rods or rocker arms. The camshaft is driven by a chain which is lubricated by oil under pressure. It is silent, reliable and maintenance-free.

Preheating of the intake air is thermostatically controlled. As the intake air to the engine is always preheated when the ambient air temperature is low, ice formation in the throttle housing is prevented. The preheated intake air also makes the engine run more smoothly when cold.



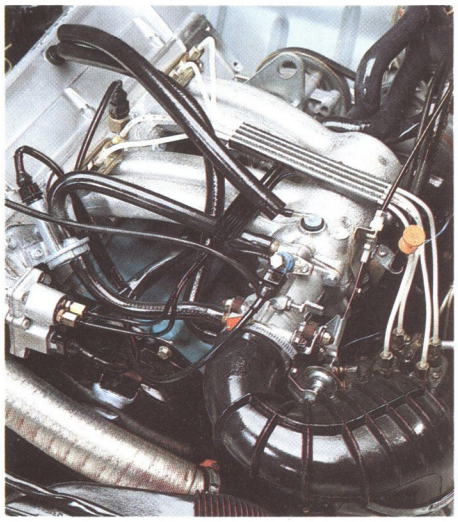
Pictured here is the Saab 8 valve engine, the 16 valve engine is shown on page 16.

Three basic versions

All Saab engines give excellent performance in relation to fuel consumption. The high torque and the flat torque curve enable the engine to deliver plenty of power even at low speeds, thus eliminating the need for frequent gear changing.

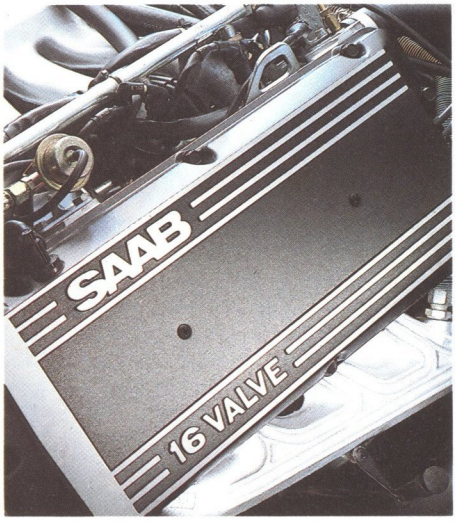
The performance of a car should not be measured merely in terms of top speed or acceleration from 0 to 60 mph. Power at low engine speeds, the ability to deliver the power when needed for overtaking, and to maintain a high cruising speed mile after mile are far more important.

The Turbo engine is a unique Saab innovation. The acceleration and top speed of the Saab Turbo matches that of many cars with six-cylinder or eight-cylinder engines, yet the Turbo does not have the drawbacks inherent in the other engines: large, heavy power units with numerous moving parts and high fuel consumption. Indeed, the Saab turbocharged engine has been referred to by the motoring press as "the engine of the future".



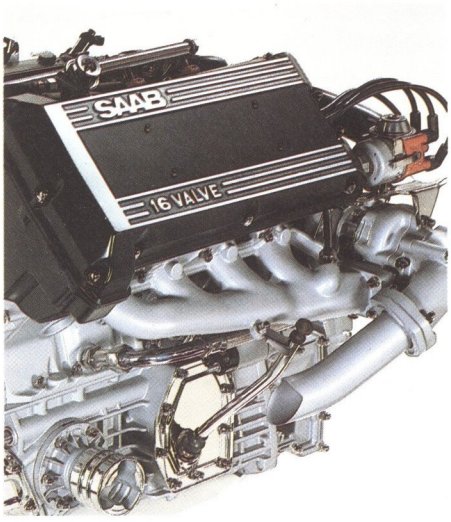
Naturally-aspirated 8 valve engine

This engine is equipped with mechanical fuel injection, which ensures efficient combustion of the fuel under varying driving conditions. The system is very reliable and the engine is easy to start when cold.



Naturally-aspirated 16 valve engine

The new Saab 16 valve engine has electronic fuel injection, double overhead camshafts, 16 valves and knock sensor controlled ignition. It is a smooth running engine with good performance and low fuel consumption.



Turbocharged 16 valve engine

The top of the Saab line is a turbocharged, 16 valve engine with electronic fuel injection, intercooler and APC-system. The superb performance on overtaking, even at low engine speeds, puts the engine in a class of its own. Cruising speeds and maximum speed are also very high.

Performance:
The Saab engines

"...one of the best four cylinder engines anywhere..."

(ROAD TEST, U.S.A)

All Saab engines for the U.S. are equipped with Bosch Fuel injection. The CI (Continuous Injection) mechanical fuel-injection system, provided in the 8 valve naturally-aspirated engine operates as follows.

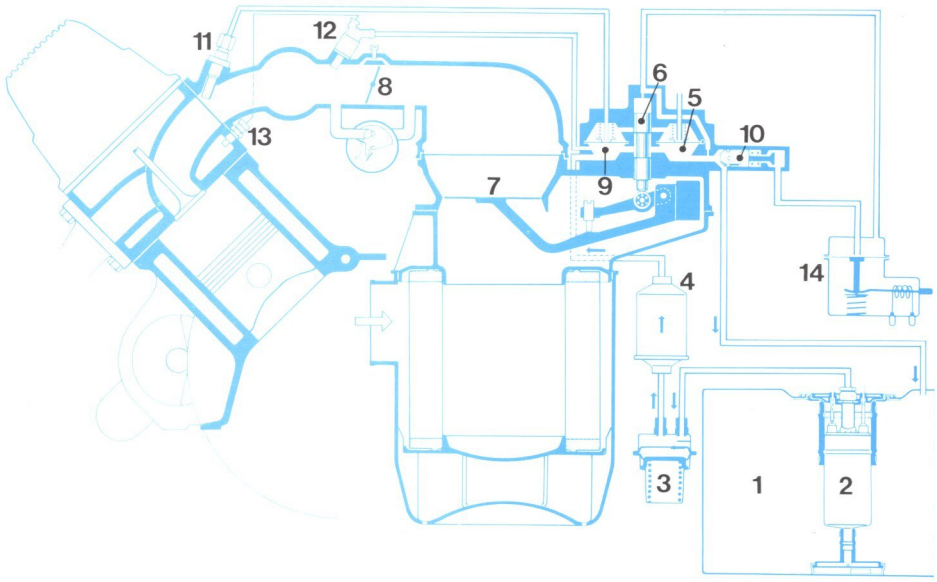
Fuel is pumped to the fuel distributor which is the heart of the system. The distributor apportions quantities of fuel to the injection valves relative to the amount of air being drawn into the engine.

Inside the fuel distributor is a control piston (6), the position of which is regulated by the arm supporting the measuring disc (7) in the air intake.

The measuring disc moves up and down and adopts a position determined by the speed of the engine and the position of the throttle plate (8). The greater the flow of air, the higher the measuring disc and the control piston will be lifted.

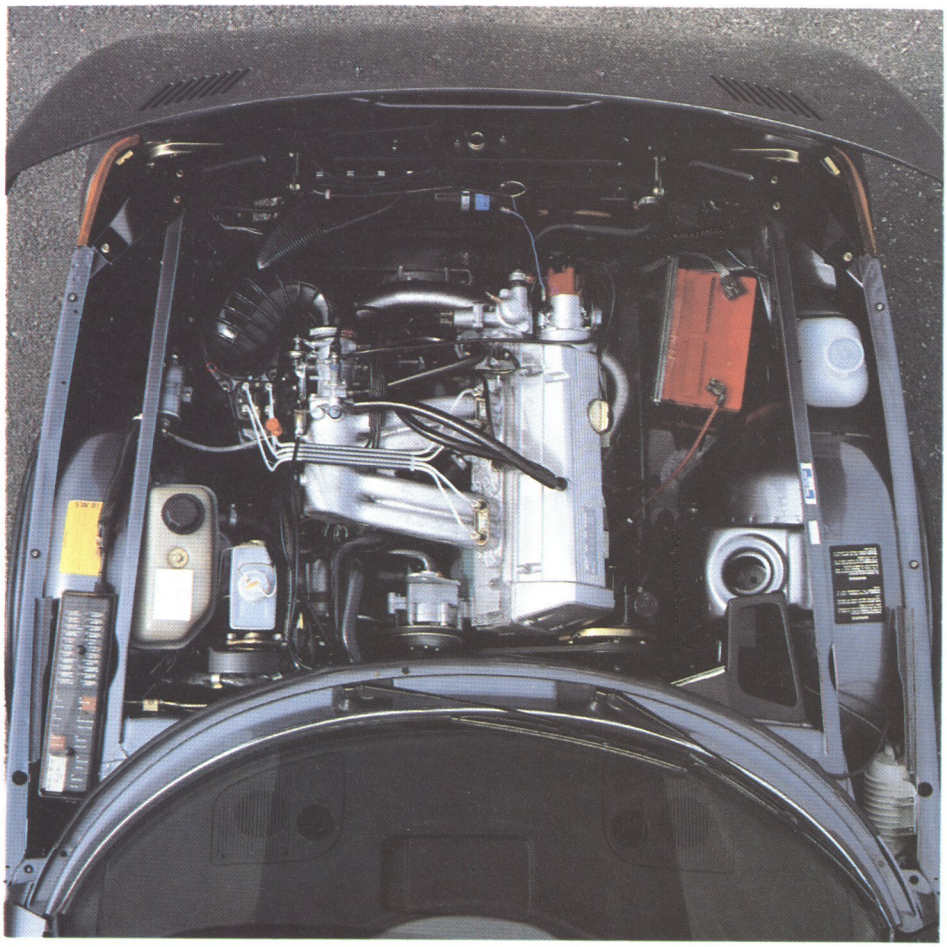
The control piston has four vertical slots, one for each engine cylinder. As the control piston is lifted, the slots are gradually exposed, allowing a greater quantity of fuel to flow to the spring-loaded injection valves at each cylinder. The fuel is injected continuously, once the fuel pressure is high enough. When the engine stops, the pressure in the system falls and the valve closes again.

During cold-starting, a special valve injects an additional quantity of fuel. The cold-starting valve is controlled by a thermostatic switch. There is also a pressure control regulator, which reduces the pressure above the control piston, allowing it to pass a richer fuel/air mixture as a function of oxygen content in the exhaust. Because the operation of the pressure control regulator is partly governed by engine temperature, the valve performs the same function as the choke on a carburetor engine.



THE BOSCH CI CONTINUOUS MECHANICAL FUEL INJECTION SYSTEM

1. Fuel tank.
2. Fuel pump (inside the tank).
3. The pressure accumulator, which maintains a given fuel pressure between the time the engine has stopped and the starting of the hot engine.
4. Fuel filter.
5. Fuel distributor.
6. Control piston.
7. Measuring disc.
8. Throttle plate.
9. Differential pressure valve maintaining constant pressure drop across metering slots.
10. Line pressure regulator for constant fuel supply pressure.
11. Injection valve.
12. Cold-starting valve.
13. Thermostatic switch for cold-starting valve.
14. Pressure control regulator.

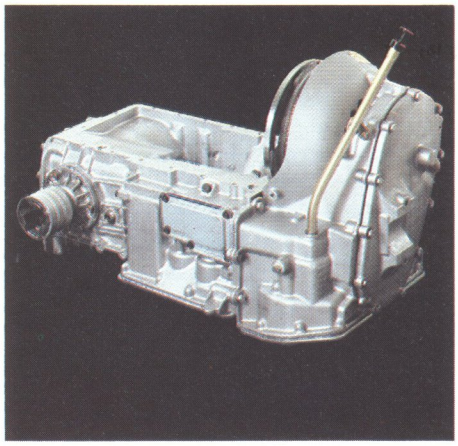


Cooling system

Owing to the ample space in the engine compartment, it has been possible to accommodate a large radiator in the Saab 900. The capacity of the cooling system is sufficient to provide adequate cooling of the engine even when the car is towing a trailer up mountainous roads.

Cooling is controlled by a reliable wax thermostat. To avoid loss of coolant, a separate expansion tank is provided which accepts the extra volume when the coolant expands and returns it as the system cools down.

Thanks to the efficiency of the cooling system, only a fairly small volume of coolant is required, and the engine therefore warms up quickly. Another reason for this is that there is no belt-driven radiator fan which runs continuously. The fan in the Saab 900 is driven by an electric motor, controlled by a thermostatic switch. The fan therefore cuts in automatically only when the engine requires additional cooling, such as when the car is stopped in traffic.



Manual transmission

A five speed manual transmission is standard equipment on all Saabs.

The transmission, final drive and differential form an integral unit, with its own lubrication system. The drive shafts have double universal joints, the outer ones being of the Rzeppa type, to provide smooth steering and a positive "feel" to the steering wheel, even when the car is cornering hard. All joints are permanently lubricated.

The primary drive consists of a silent chain transmission. Since the clutch is fitted at the front of the engine, it is adequately cooled and therefore has a long service life. It is also readily accessible for servicing.

Automatic transmission

A Borg Warner 3-speed automatic transmission is optional on most models. The unit is integrated with the engine to provide the most compact design. The engine drives through a torque converter and chain transmission to the transmission and differential. The automatic control unit is incorporated in the front housing of the transmission and is readily accessible from below.

Delivery of the power to the driven wheels is steady and even, and the car therefore accelerates smoothly. The Saab automatic transmission has a wide margin of "overlap" so there is no continual shifting of gears in town traffic, when speeds tend to fluctuate between 15 and 30 mph. The automatic transmission is designed to cope with the high power delivered by the Saab 900 Turbo. Combined with the Turbo engine, the new automatic transmission makes for exceptionally smooth driving. The rapidity of the automatic gear changes enables the engine to maintain turbocharger boost throughout acceleration.

Exhaust emission control

All Saabs have a breakerless ignition system, which has no moving parts to wear out. The setting of the ignition timing remains unaltered and combustion of the fuel is maintained at maximum efficiency for very long periods before servicing is necessary. This makes for better fuel economy, good performance and cleaner exhaust.

Due to U.S. exhaust emission requirements, all Saabs are fitted with a decel fuel device. Furthermore, the Lambda system which controls the fuel/air mixture in the engine and a catalyst which removes the unburned hydrocarbons, carbon monoxide and nitrons oxides from the exhaust is standard in all cars. All cars in the U.S. must run on lead-free gasoline.

Turbocharging

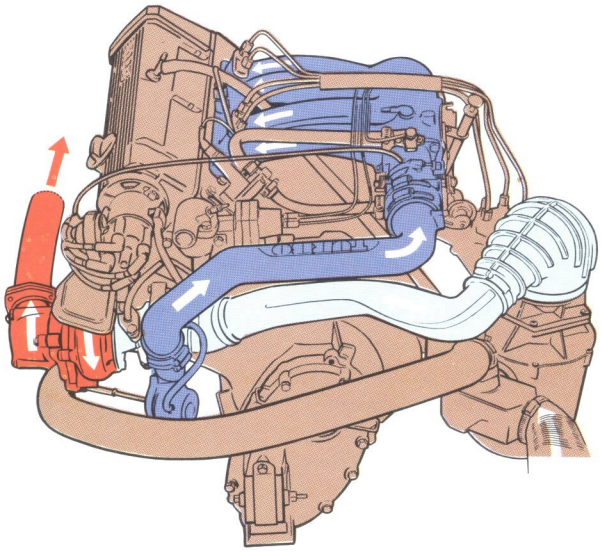
"...ranks among the best and most exciting automobiles we have ever tested. We were impressed with the Saab Turbo to the point that it will probably become the standard by which all other cars are judged. Need we say more?"

(AUTOSPORT, CANADA)

Turbocharging has long been used for increasing the output of truck and aircraft engines. In high-performance competition cars, turbochargers have been employed to achieve very high top speeds. Saab-Scania had already accumulated a wealth of experience in turbocharging of truck and bus engines when the turbocharged Saab 99 was launched in 1977.

Saab was the first among the world's car manufacturers to adapt the turbocharging technique to everyday driving. In a Saab Turbo, the boost in performance starts at low engine speeds. The engine delivers maximum torque at a speed of 3000 rpm. This provides massive power resources for overtaking without the need for down shifting. So the Saab Turbo has been designed for normal, everyday motoring instead of the extreme top speed demands of the competition driver.

With the turbocharger, the performance of the 4-cylinder Saab engine is on a par with 6-cylinder or 8-cylinder engines. But experience has shown that the high performance of an engine is not used during 80-85 per cent of the driving time. In this case, the turbocharger runs without adding to or detracting from the engine output, and the engine returns a fuel economy that is nearly equal to that of a naturally-aspirated fuel injection engine. In a Saab Turbo, one "pays" for high performance only if it is actually used.



The turbocharger consists of a turbine section and a compressor section. The exhaust gases flow through the turbine, while the compressor handles the engine intake air. In brief, the system operates as follows:

The engine exhaust gases flow through the turbine casing, in which a bladed wheel is induced to rotate at very high speed, up to 120,000 revolutions per minute. The turbine wheel drives the compressor impeller through a shaft.

When the turbocharger has reached a certain speed, the compressor starts to boost the pressure of the intake air. Due to the pressure increase, more air is forced into the cylinders. As a result,

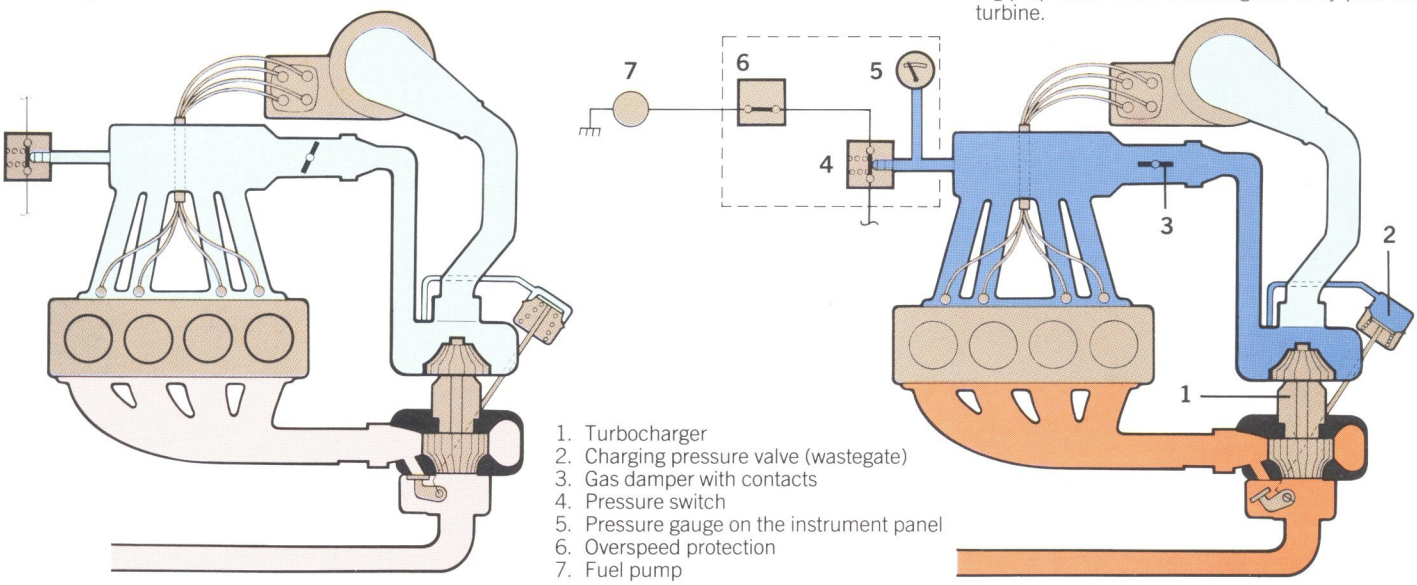
IDLING SPEED OR LIGHT THROTTLE

The exhaust gases flow through the turbine to atmosphere. The turbine runs without absorbing or delivering power, and the engine runs as a conventional, naturally-aspirated engine.

HIGH ACCELERATION OR FULL THROTTLE

Due to the higher exhaust gas flow, the turbine and compressor run at a higher speed. More air is forced into the cylinders and the engine output increases. The turbocharger is operative.

When the pressure in the intake manifold has reached a certain predetermined value, the charging pressure valve will gradually allow an increasing proportion of the exhaust gases to by-pass the turbine.



1. Turbocharger
2. Charging pressure valve (wastegate)
3. Gas damper with contacts
4. Pressure switch
5. Pressure gauge on the instrument panel
6. Overspeed protection
7. Fuel pump

more fuel can be injected and burned. The engine delivers more energy per piston stroke and the torque and output of the engine thus increase.

The turbine is combined with a charging pressure control valve, also known as a wastegate, which automatically controls the charging pressure throughout the engine speed range.

In addition, if the charging pressure should exceed a predetermined value, a pressure switch will temporarily interrupt the fuel supply. The system is provided also with engine overspeed protection. When the engine speed has risen to 6000 rpm, a switch will open the ignition circuit until the engine speed has fallen to an acceptable level. The engine thus is monitored by two safety switches designed to prevent overloading.

Turbo reliability

The Saab turbocharging system is not the same as tuning in the usual sense. The engine actually delivers peak output at a lower speed than the standard engine and the compression ratio is also lower.

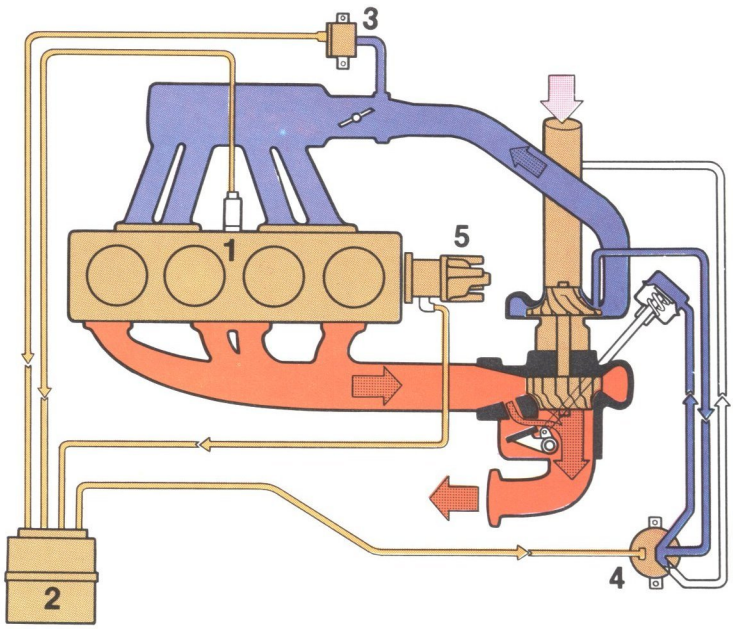
The wear of an engine can generally be classified into speed-dependent and temperature-dependent wear. The speed-dependent wear of the Turbo engine is lower than that of the standard engine, partially due to the fact that the power resources available enable the car to be driven in a higher gear than a car powered by the standard engine in situations such as on uphill gradients and in city traffic. Another reason is that Turbo cars incorporate overspeed protection.

The temperature of the exhaust gases from the turbocharged engine is no higher than that of the exhaust gases leaving the conventional fuel injection engine, but the gas flow is higher. Components exposed to heat are therefore protected, modified or uprated to withstand the higher output with a comfortable margin. The turbocharged engine is also equipped with a radiator with a larger number of cooling passages and a radiator fan with a higher output than that of the conventional fuel injection engine. Whenever necessary, the fan runs on, even after the ignition has been switched off for a predetermined period.

Saab Turbo with APC

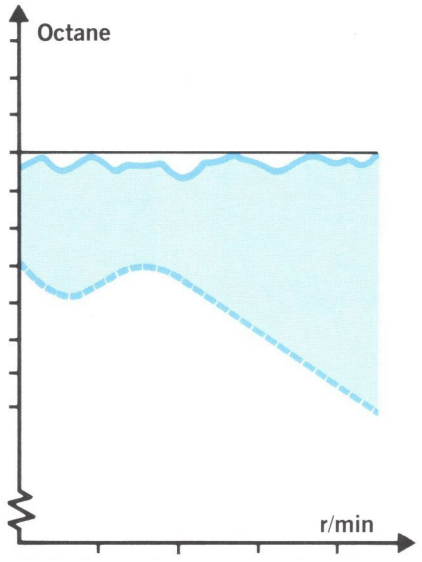
The automotive world has become accustomed to major items of news from the Saab Development Department. The "everyday turbo" is merely one of a succession of innovations, the Saab Turbo with APC (Automatic Performance Control) is another. This engine adjusts itself automatically to the fuel used. The higher the octane number, the higher the engine output. But the most important benefit is that the higher compression ratio made possible by the APC system makes the turbo engine even more fuel efficient.

Saab has again been in the lead in launching an innovation. But Saab has also manufactured and delivered more than 125,000 turbocharged cars to all corners of the world, and must be regarded as the leading European manufacturer of gasoline fueled turbo engines.



The APC system developed by Saab enables the Turbo engine to extract a maximum amount of energy from any grade of fuel, so the car is more economical. The APC system also protects the engine against dangerous knocking at high engine loads.

The brain of the system consists of an electronic control unit (2). This receives signals from three sources – from the distributor (5), a knocking sensor in the engine block (1) and a pressure sensor in the intake manifold (3). As soon as the electronic unit detects knocking, it will apply a signal across the solenoid valve (4) to the turbocharger to reduce the charging air pressure.



An engine without the APC system (dashed curve) must be designed so that it incorporates adequate margins for engine tolerances, the condition of the engine and varying climatic conditions. Such an engine cannot utilize the full energy content of the fuel.

The APC system enables the engine to utilize the maximum energy content of the fuel at any engine speed (continuous curve). The charging pressure delivered by the turbocharger is continuously adjusted to the knocking limit of the fuel/air mixture in the cylinders, and the engine can therefore be run on fuel of widely varying octane ratings.

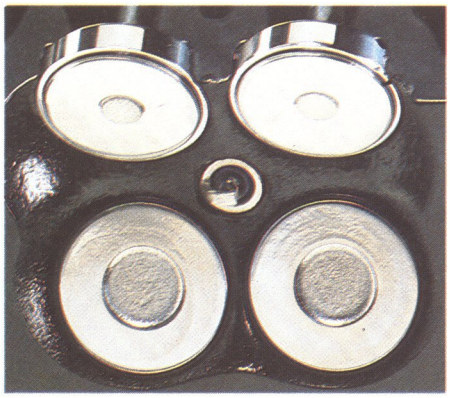
The 16 valve engine

"...remarkable low-speed performance, virtually from idling speed. The performance is lively, without constant gear-shifting, and this is also reflected in the fuel consumption figures."

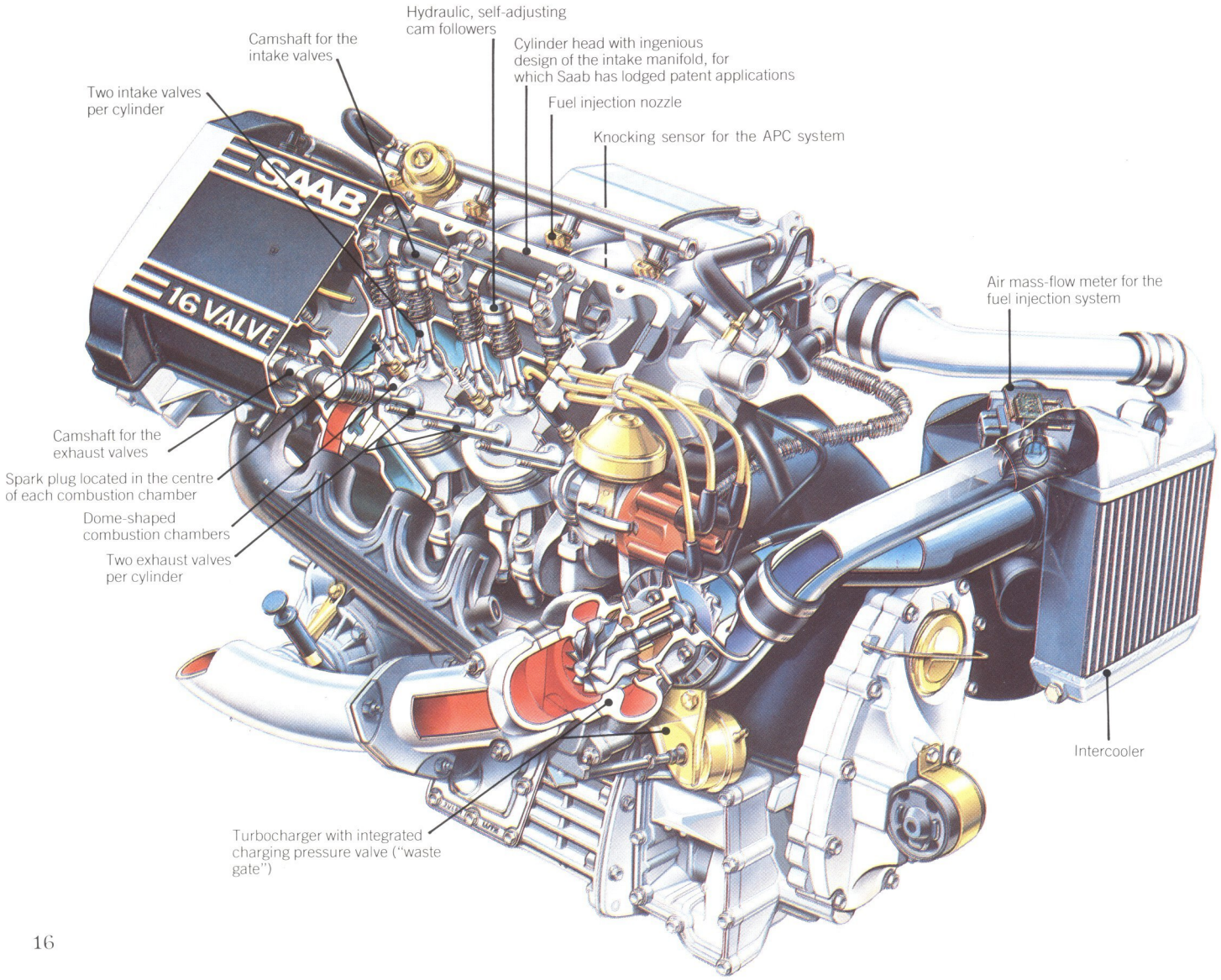
(VI BILÄGARE, SWEDEN)

The Saab 16 valve engine for everyday motoring marks a new milestone in the development of internal combustion engines. The Saab 16 valve engine, a further development of the proven, two-litre engine, is equipped with electronic fuel injection.

Engines with four valves per cylinder have long been used by Saab and other makes to power rally and competition cars. But the new Saab 16 valve engine is not a competition engine designed for the highest possible performance within a narrow range of engine speeds. On the contrary, it is an everyday "workhorse" with good low-speed performance, optimized for the best possible economy, durability and reliability.



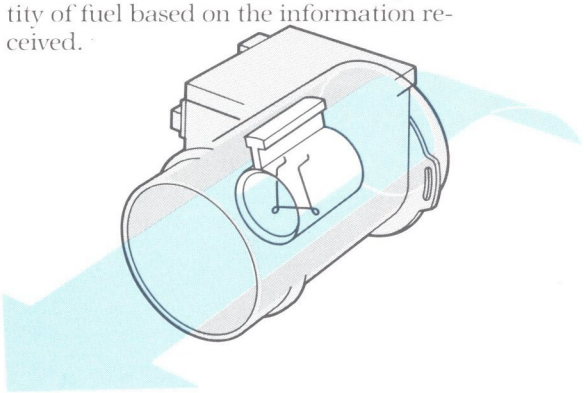
Engines with four valves per cylinder will probably dominate the future. Most car manufacturers are developing engines with four valves per cylinder, although Saab is among the forerunners in producing a 16 valve engine designed for everyday motoring.

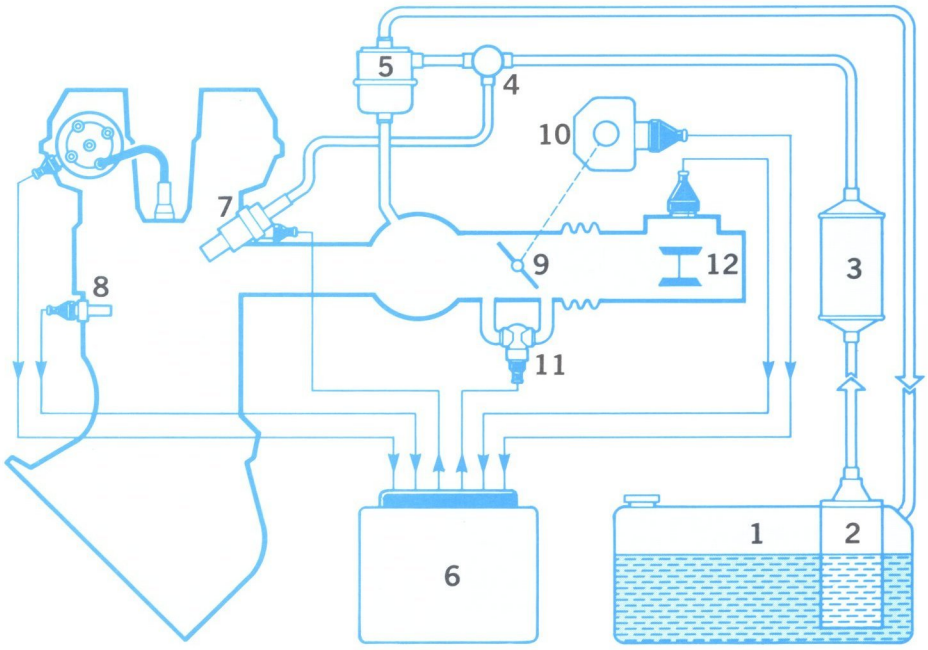


New fuel injection system

The Bosch LH-Jetronic electronic fuel injection system is newly developed. An electronic control unit monitors the fuel/air ratio. The system includes a new type of air flow meter which measures the mass flow instead of the volume flow, so that the fuel can be metered more accurately in relation to the climate conditions. The engine thus is less sensitive to variations in the ambient temperature and the atmospheric pressure. It is thus unaffected by the low air pressures at high altitudes. The new fuel injection system also makes the engine easier to start, whether hot or cold.

The operation of the air flow meter is briefly as follows: The air flows through the tubular air meter, where it passes an electrically heated platinum wire. As this rate of air flow increases, the wire cools. As the wire is cooled, its electrical resistance decreases. The electronic control unit of the fuel injection system senses the electrical resistance of the wire, and this senses the rate of air flow. The control unit also analyses engine speed, engine temperature and engine load, and determines the correct quantity of fuel based on the information received.





1. Fuel tank
2. Fuel pump
3. Fuel filter
4. Fuel distributor
5. Pressure regulator
6. Electronic control unit
7. Injection valve
8. Temperature transducer
9. Butterfly valve
10. Butterfly valve contacts
11. Idling valve
12. Air mass meter

The fuel pump (2) delivers the fuel from the tank (1) through the filter (3) to a distribution pipe to each injection valve (7). The pressure regulator (5) connected to the distribution pipe maintains a constant differential between the fuel pressure and the air pressure in the intake manifold. Excess fuel is returned to the fuel tank.

One injection valve for every engine cylinder is fitted to the intake manifold, upstream on the engine intake valves. The injection valve is controlled electro-magnetically by signals from the electronic control unit. The electronic control unit calculates the opening time for the injection valve to suit the engine running conditions, so that the correct quantity of fuel will be supplied in relation to the quantity of air drawn by the engine.

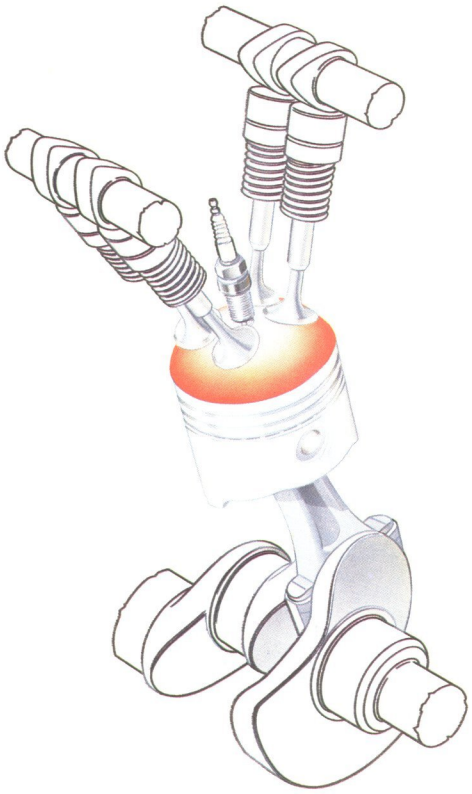
Performance: The 16 valve engine

"Saab – the innovative car manufacturer from Sweden – has again taken over the role of trend-setter."

(AUTO MOTOR UND SPORT, WEST GERMANY)

Ideal combustion chamber

The combustion chamber is of the most efficient design known to engineers today. It is dome-shaped, and the piston crown is relatively flat. The intake manifold is shaped to improve the turbulence in the combustion chamber, and Saab has lodged patent applications for this design. Each of the two pairs of valves has a large flow area, and the engine can thus "breathe" efficiently. Since the engine has four valves per cylinder instead of two, the individual valves are subjected to far less demands. The thermal stresses, for instance, are appreciably lower at a given engine rating than in an engine with only one intake and one exhaust valve per cylinder. The four-valve arrangement enables the spark plug to be located in the center of the combustion chamber, so the burning of the fuel spreads uniformly throughout the combustion chamber. Engine designers describe this as a short and uniform flame path.



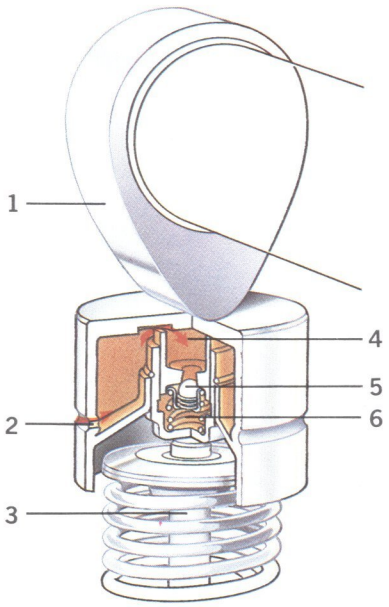
In an engine with two valves per cylinder and the spark plug located on one side of the combustion chamber, the flame path is long and asymmetrical. If the temperature at the far end of the combustion chamber is high, the fuel/air mixture may preignite before the flame has reached it, and the engine will then "knock". To avoid such knocking, the compression ratio in this type of engine must be low.

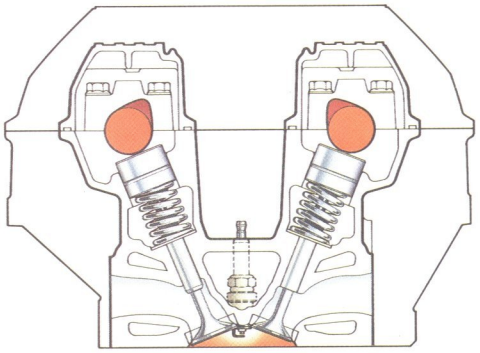
If the engine has four valves per cylinder and the spark plug is located centrally, the compression ratio can be raised without the risk of preignition and harmful knocking. A high compression ratio increases the engine efficiency, enables the engine to use the energy in the fuel more effectively, and raises the engine output, while still maintaining low fuel consumption. In the Turbo, the Saab APC system plays an important role in this respect. Using a knocking sensor and an electronic control unit, the system continuously supervises the engine load. The engine can thus be run on any grade of fuel between 87 and 93 octane. At the same time, the APC system reduces fuel consumption.

The combustion chamber is dome-shaped, the piston crown is flat and the spark plug is located in the center of the combustion chamber. The two pairs of valves have a large flow area, allowing the engine to breathe efficiently. Since the engine has four valves per cylinder instead of two, the individual valves are subjected to far less demands.

Self-adjusting hydraulic cam followers

Since the hydraulic cam followers of the Saab 16 valve engine are self-adjusting, periodic adjustments of the valve clearances are no longer necessary. This simplifies the service work and reduces the maintenance cost. Since the valve clearance is always correct, engine wear will be reduced. The valve noise will also be lower, and the engine thus will run silently and smoothly while providing precise valve actuation.





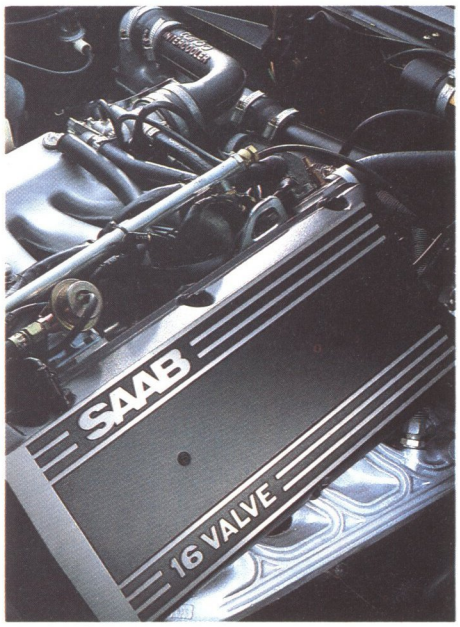
The cam followers adjust themselves automatically to suit changes in the lengths of the valve stems at different temperatures. The most important benefits are very silent running, very high reliability and accuracy.

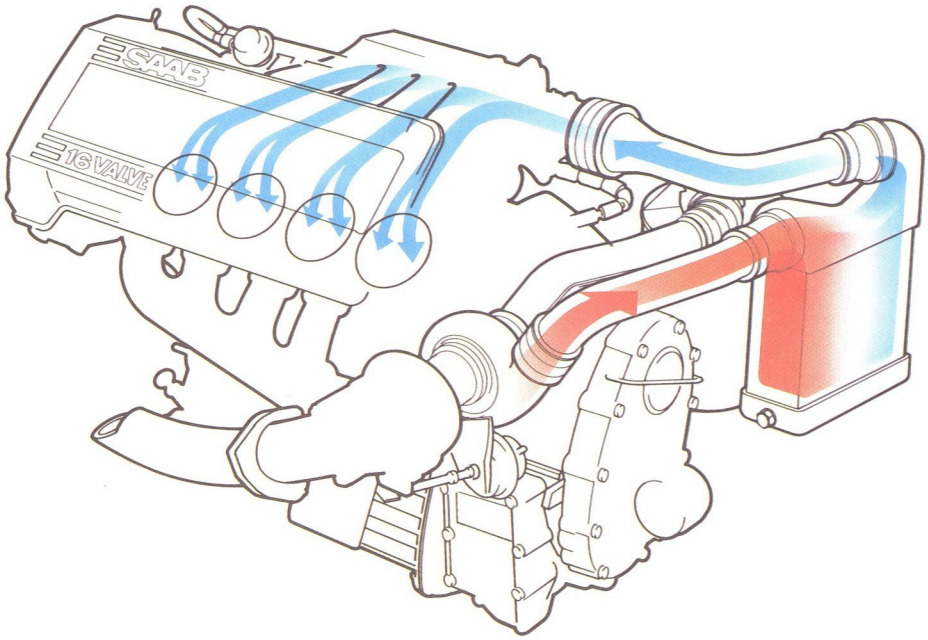
1. Cam
2. Oil supply
3. Valve
4. Oil reservoir
5. Check valve
6. High-pressure chamber

Intercooler with safety valve

When the intake air to an engine is compressed by a turbocharger, its temperature will increase. But by routing the air through an intercooler between the turbocharger and the engine, the temperature of the air will be lowered and its density will consequently increase. Since the density of the air is higher, the engine receives more oxygen and more fuel can be supplied, thus increasing the engine output.

The intercooler used on the 16 valve Turbo engine has been developed by Saab, and has been adapted to perform well, even in very cold weather. An intercooler can be blocked by ice, and can therefore perform unsatisfactorily at conditions of low temperatures and high humidity. To avoid such problems, the new Saab intercooler is equipped with a safety valve that will by-pass the intake air across the intercooler element if icing should occur.





Road behavior

"The car we tested was shod with summer tires, in spite of the snow, although this actually of minor significance. Saab is among the world's very best winter cars in terms of roadholding and mobility – this was proved to us once again ..."

(TEKNIK FÖR ALLA, SWEDEN)

Good road behavior has been a distinctive feature of all generations of Saab cars. The joy of driving and the roadworthiness are probably the traits which have received the most widespread acclaim of the motoring press over the years.

The Saab 900 has the fast and positive steering-wheel response of a sports car and is very sure-footed on sudden maneuvers. And it is exceptionally faithful to the steering wheel, regardless of the road surface. The geometry of the front and rear assemblies and the weight distribution have given the car a consistency of behavior that is almost entirely independent of how it is loaded.

The track is wide and the car rolls very little when subjected to lateral forces on hard cornering. Long-term practical tests have led to perfect matching of the springing and shock absorbers to provide good road behavior and a superb ride, be it on smooth or bumpy surfaces.

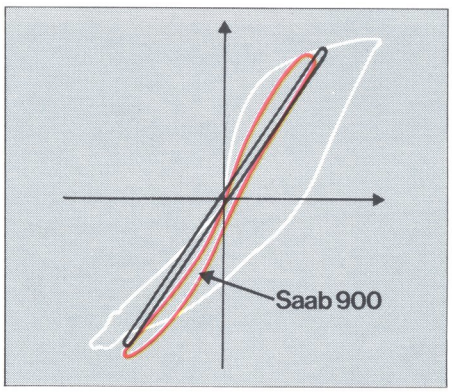
The ideal car

A car must be able to give the driver fast and accurate information in all situations. The human being is very sensitive in this respect – differences of one-hundredth of a second are immediately detected.

In theory, there should be no delay between movement of the steering wheel, the car's response to the movement and the time that the driver feels the car responding. The way in which the driver feels the car responding should also be consistent and logical. The driver should receive fast, clear and true information through his hands, eyes and body.

"The easiest way of detecting the characteristics of a car is to try a number of sudden swerving maneuvers ... in the Saab 900 Turbo. I could do faster swerving maneuvers at higher speeds than I have ever been able to do in a standard car."

(SVENSKA DAGBLADET, SWEDEN)



Technical language used to describe the way in which a car responds to movement of the steering wheel includes such phrases as "angular turning rate" and "lateral acceleration". The angular turning rate is something that the driver can identify through his eyes, and lateral acceleration through his body.

If the angular turning rate is plotted as a function of lateral acceleration on a graph, then the curve for the theoretical ideal car will be a very narrow elipse (the black curve in the graph).

The white curve represents a competing car with front-wheel drive and with acknowledged good handling and roadholding properties. The deviation from the ideal curve is fairly wide. The red curve represents the Saab 900S, whose well balanced chassis provides the car with virtually ideal characteristics.

Many interacting factors

Good road behavior is not the result of one or two design features. The behavior of a car depends on a host of interacting factors.

"Stability is really excellent, and there are few other cars we would wish to be in on a galeswept, rain-soaked motorway ..."

(MOTOR, GREAT BRITAIN)

When travelling at a moderate speed on "good roads", all cars behave in a proper, disciplined manner. Only when the driving conditions become more difficult does a car start to show its worth. Indeed, what makes a Saab 900 so outstanding when road and weather conditions are at their worst is the ideal combination of front-wheel drive, favorable weight distribution, suspension, rack-and-pinion steering and the geometry of the steering and the front and rear assemblies in general.

"Forgiving nature"

The directional stability of the Saab 900 is very high, regardless of the speed at which the car is moving, the road sur-

face or loading. Since the driving wheels and steered wheels are those under the greatest loading, there is little chance of wheelspin, which is an important consideration when the roads are icy, snow-covered or otherwise difficult. The design of the chassis also makes the Saab 900 a car with a forgiving nature. In other words, the car can tolerate minor errors on the part of the driver.

The exemplary road behavior of the Saab explains why the majority of those professionals who have the opportunity to test different cars under various driving conditions – the motoring journalists – choose to drive a Saab when the weather is bad and the road slippery.

"It's no fun to venture out onto slippery winter roads in a full snow storm, but the Saab 900 is one of the best cars I have driven in such weather."

(LAND, SWEDEN)

Large wheels

All Saab 900 cars are fitted with 15-inch wheels. Tire type and size varies with different models (see specification section for details). All tires used on the various Saab models are chosen to combine excellent high speed properties with a good level of comfort.

"Saab is the No. 1 winter car. This is beyond any doubt..."

(ARBETET, SWEDEN)

Pivot-mounted coil springs

The coil springs are pivot-mounted, a fairly unusual refinement on standard cars. The springs have progressive action provided by substantial buffers inside the springs. This reduces the risk of "bottoming" when the car is being driven over a very rough surface.

The spring travel of the front wheels is designed to ensure very good road adhesion when the car is driven over an abrupt crest or is cornering hard.

Gas shock absorbers are standard on all models. These shock absorbers give the car even better road behavior characteristics and make for an even smoother ride than can be achieved with conventional shock absorbers.

The Saab 900 Turbo with the Special Performance Group option, and the 900S two-door, are equipped with sturdy stabilizor bars at the front and rear, to improve further comfort and roadholding in the higher range of speeds.

"Directional stability is faultless, even at high speeds. Cross-winds are hardly noticeable. The car has a slight amount of understeer on cornering. Load variations, even when they are intentional, are barely perceptible. The brake system (discs all round) is entirely adequate for the increased engine output."

(AUTO-ZEITUNG, GERMANY)

Safety: Road behavior

"The chassis design is also advanced and, as mentioned earlier, this results in superior mobility – at the same time as the car behaves in an exceptionally cultured way on the road – be it pavement, gravel or a sheet of ice."

(TEKNIK FÖR ALLA, SWEDEN)

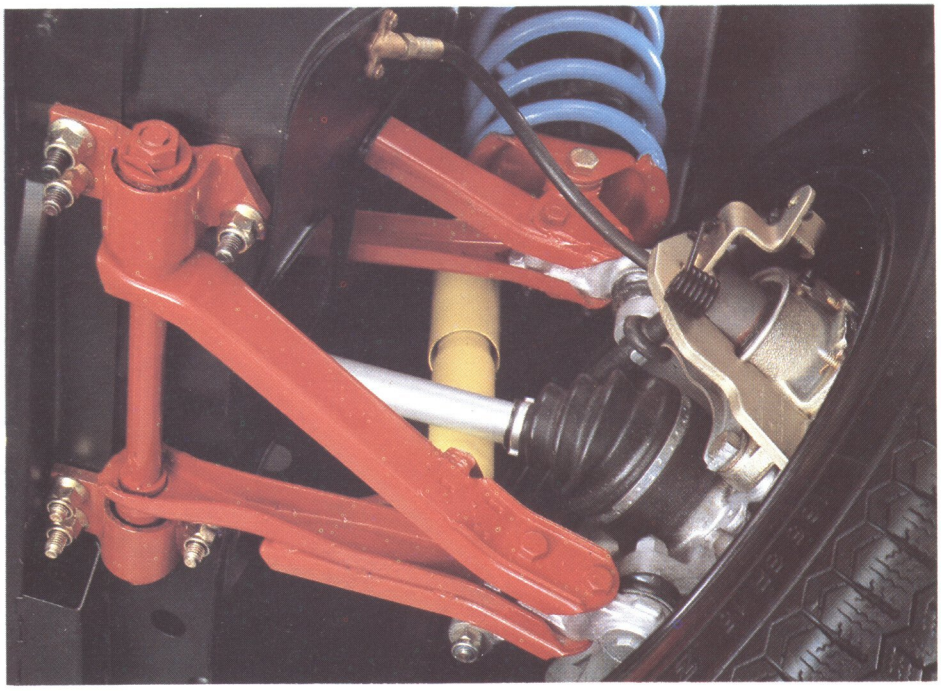
The Saab 900 has rack-and-pinion steering to give the driver a positive feel of the road.

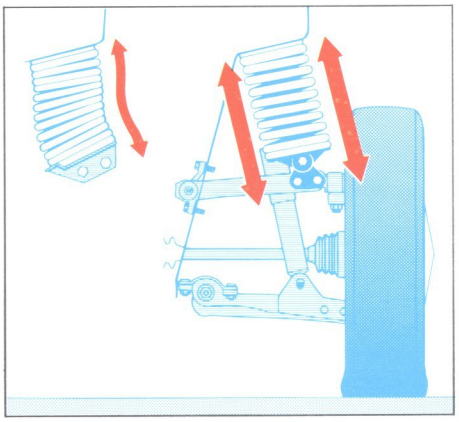
The wheels respond directly and exactly to the slightest movement of the steering wheel. Owing to the rotation of the drag link, the change in the deflection of the wheels caused by upward or downward movement is negligible. Consequently, the driver does not have to correct the course when the wheels encounter small irregularities in the road surface.

For safety reasons the steering gear is located well back in the engine compartment, where it is well protected behind the engine.

All Saabs are equipped with power-assisted steering. The Saab power-assisted steering system has been refined to such an extent that it can confidently be said to be clearly better than manual steering in all respects.

The turning circle diameter is 33.8 feet and the number of turns of the steering wheel lock-to-lock is 3.7.

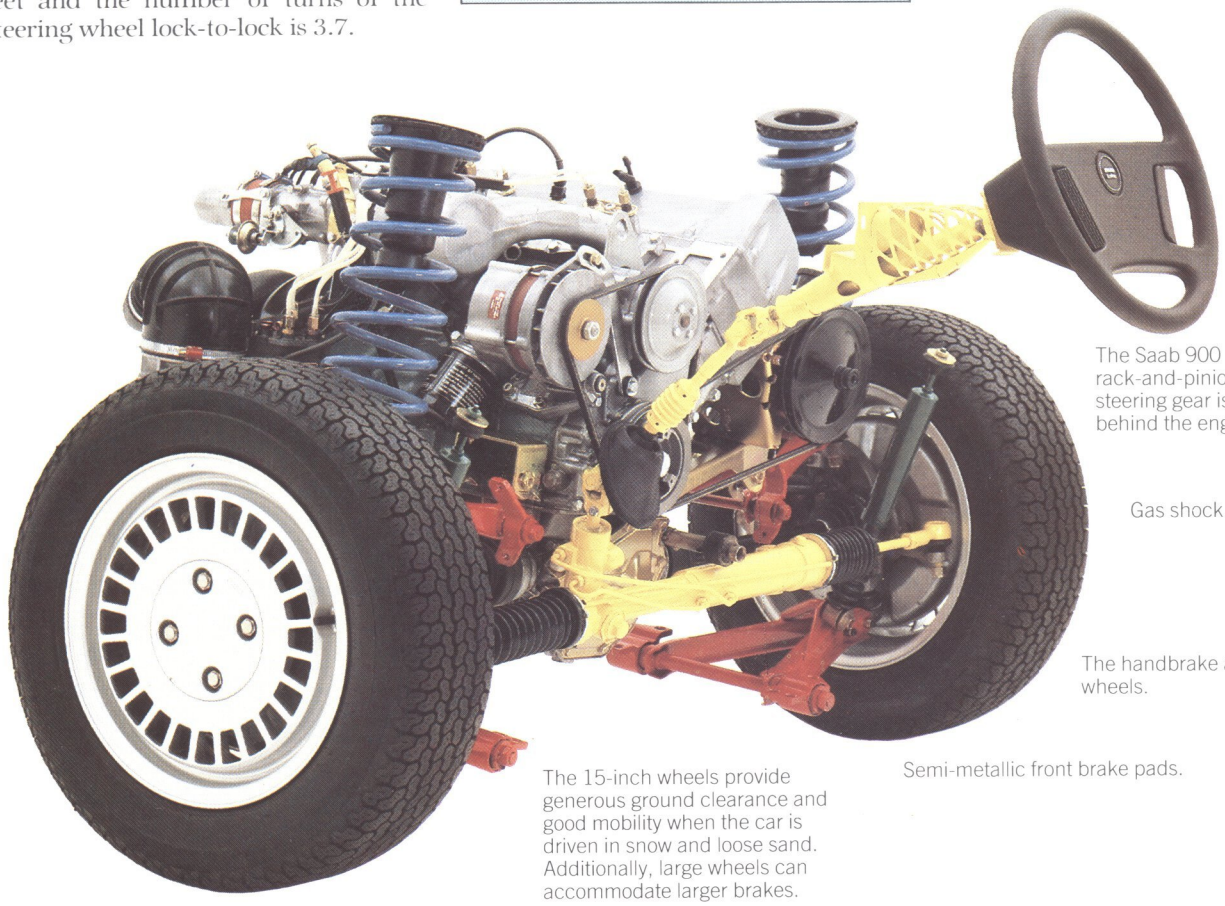




The front suspension is of the double wishbone type. The wishbones are mounted in rubber bushings and the swivel joints are permanently lubricated.

PIVOT-MOUNTED SPRINGS

The coil springs of the front wheels are pivot-mounted. Because of this, the springs always operate straight and do not deflect along the longitudinal axis, even at maximum spring travel. Thus, they are fully effective at all times, to the benefit of the road behavior of the car and to riding comfort, especially on poor roads. Pivot-mounted springs also work more silent than conventionally fitted coil springs.



The Saab 900 has power assisted rack-and-pinion steering. The steering gear is well protected behind the engine.

Gas shock absorbers.

The handbrake acts on the front wheels.

Semi-metallic front brake pads.

The 15-inch wheels provide generous ground clearance and good mobility when the car is driven in snow and loose sand. Additionally, large wheels can accommodate larger brakes.

Disc brakes

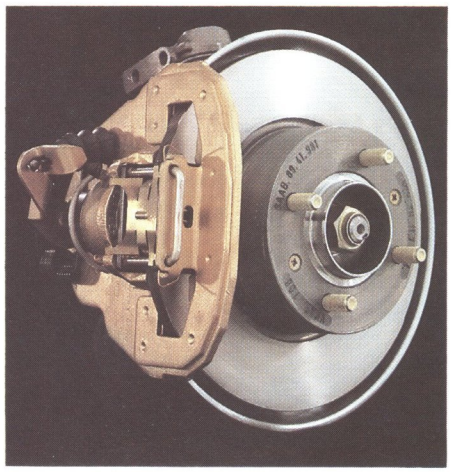
The Saab 900 has disc brakes all round. Brake linings of different materials and with different characteristics are fitted at the front and rear. This is designed to provide the shortest possible braking distance under different road conditions and to ensure consistent behavior in a variety of situations. On gentle braking from a moderate speed or on a slippery surface, the braking effort distribution is 70% on the front wheels and 30% at the rear. On heavy braking on dry roadways the front brakes exert a relatively higher braking effort and the front/rear distribution is then 80/20%.

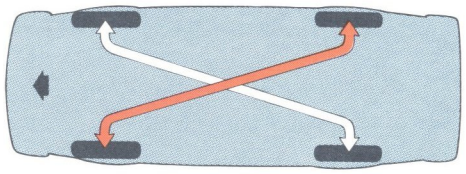
If the driver should ever apply the brakes so hard that he locks the wheels, the Saab will still stay on course.

The brake system is diagonally split in two circuits. Each of the circuits acts on one front wheel and the diagonally opposite rear wheel.

The handbrake, which is self-adjusting, acts on the front wheel discs. The braking effort of the handbrake is about 50% of that of the footbrake system. And because it acts on the front wheels, it can be used as an extra brake. The handbrake is actuated every time the footbrake is used, which reduces the risk of the handbrake seizing.

An indicator lamp lights on the instrument panel when the handbrake is applied. The brake lines are well protected from physical damage and chemical attack. They are anti-corrosion treated and run in ventilated passages inside the car. A warning lamp will light if a fault should develop in one of the brake circuits or when the brake fluid level is low.





Semi-metallic pads

The Saab 900 has semi-metallic brake pads at the front. This new generation of pads has many advantages over conventional disc brake pads:

- They last up to twice as long.
- They reduce the sensitivity of the brakes to the high temperatures occurring during frequent heavy braking.
- They reduce the likelihood of fading.
- They are quieter and do not foul the wheels as much, as conventional pads.
- They are less polluting, as they do not contain asbestos.

Saab was first in Europe to introduce this new generation of brake pads, having initially fitted them on 1978 models of the 99 Turbo.

The rear linings on the Saab are made of an organic material and are also asbestos-free. The development of the present-day non-polluting Saab brakes – which have a longer useful life than in the past – took five years.

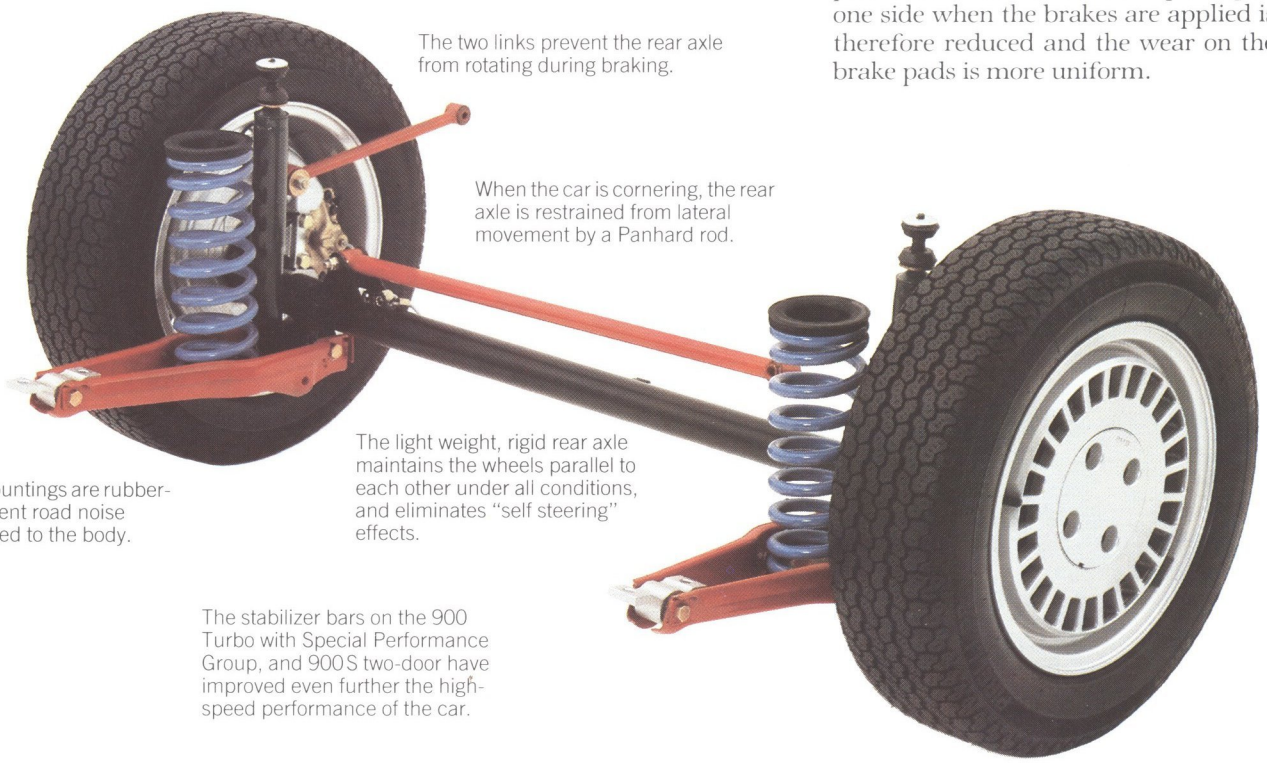
The fact that Saab was again first among car manufacturers to introduce completely asbestos-free brakes is due in no small measure to the favorable basic design of the car, including the 15-inch wheels (which give a larger effective cooling area), disc brakes all round and the "sliding brake caliper". All of these features contribute to ensuring a low brake fluid temperature.

Even braking

The master cylinder for the foot-brake system is equipped with a servo unit which produces a substantial increase in pressure in the hydraulic system. Consequently, a relatively low pedal pressure is sufficient to achieve a given braking effort.

The hydraulic fluid container incorporates a level switch. The switch lights up the red warning lamp on the instrument panel if the hydraulic fluid level should fall below a certain level. Since the container is for both brake and clutch fluid, there is an additional warning function. In the event of fluid leaking, the clutch will become inoperative first, serving as a warning to the driver.

The brake master cylinder is designed so that both hydraulic circuits are actuated simultaneously and at the same pressure. The risk of the car pulling to one side when the brakes are applied is therefore reduced and the wear on the brake pads is more uniform.



The two links prevent the rear axle from rotating during braking.

When the car is cornering, the rear axle is restrained from lateral movement by a Panhard rod.

The light weight, rigid rear axle maintains the wheels parallel to each other under all conditions, and eliminates "self steering" effects.

All rear-axle mountings are rubber-bushed to prevent road noise being transmitted to the body.

The stabilizer bars on the 900 Turbo with Special Performance Group, and 900 S two-door have improved even further the high-speed performance of the car.

Brakes and steering

"... the fore and aft brake lines of one circuit were hacked through to simulate brakage and yet the Saab still maintained stable straight line braking under a series of crash stops. It's the sort of safety margin all cars should have..."

(MODERN MOTOR, AUSTRALIA)

The large wheels have permitted larger sized disc brakes to be fitted. Comparative tests conducted by the motoring press have shown the Saab to have more effective brakes than the majority of other cars in the same class.

Saab was one of the first manufacturers to introduce dual-circuit braking systems. That was in 1963. Today, two mutually independent foot-brake systems are a legal requirement in many countries, although the legislation does not yet define how the systems should be divided.

Many cars have separate braking systems for each axle

Many existing makes of car have separate braking systems for each axle, with one circuit for the front wheels and the other for the rear wheels.

How much longer the braking distance would be if one of the circuits should fail in a car with separate systems for each axle would depend on if it was the front or rear circuit that had failed.

When the rear-wheel brakes are inoperative, the front brakes normally deliver about 60% of the normal braking effort. If, on the other hand, the front brakes were to fail, in theory, the braking effort would be reduced to 40%. In practice, however, the effective braking

effort is usually much lower, sometimes as low as 10–20%. This is because the majority of cars have a reducing valve in the rear brake circuit. The function of the valve is to limit the pressure delivered to the rear wheels, thereby reducing the likelihood of these wheels locking before the front wheels during heavy braking and especially when the car is only lightly loaded.

Tests conducted on dry, paved roads have also shown that the braking distance of a car with separate circuits front and rear (and a reducing valve in the line to the rear brakes) can be five or six times longer than normal in the event of the front brakes failing. And if the car is cornering on a slippery or gravel road, application of the rear brakes only can cause the rear end of the car to break away into a violent skid.

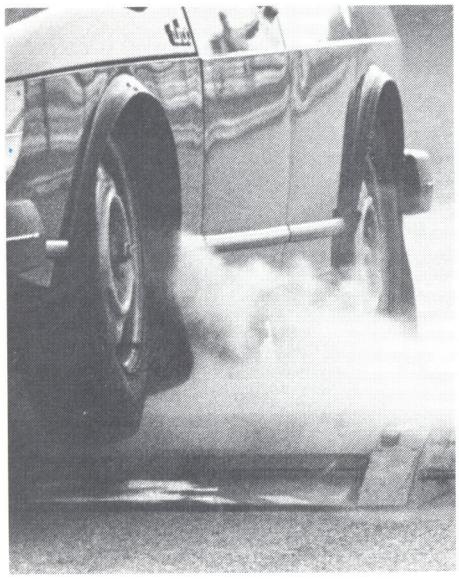
The Saab system

On the Saab 900, the two brake circuits are diagonally split. With this system, should one circuit fail, 50% of the braking effort would always be retained. The remaining circuit, acting on diagonally opposed wheels, thus makes it easier to control the car during heavy braking than if the circuit were acting on the front or rear wheels only.

Moreover, the handbrake can also be used as an extra brake. Since this brake acts on the front wheels, there is little danger of the back of the car breaking away.

The "knife test"

The positive and safe behaviour of the Saab 900 after a puncture to one of the front wheels is frequently demonstrated to the press and other representatives of the motoring world. In this demonstration, the car is driven at about 60 mph, with one of the front tires passing over a sharp-edged ramp which causes the tire to burst. The car maintains its course, without swerving at all, and the driver can steer and brake without any great difficulty.



Other demonstrations highlight the good response of the car to steering and braking when one of the brake circuits is inoperative.

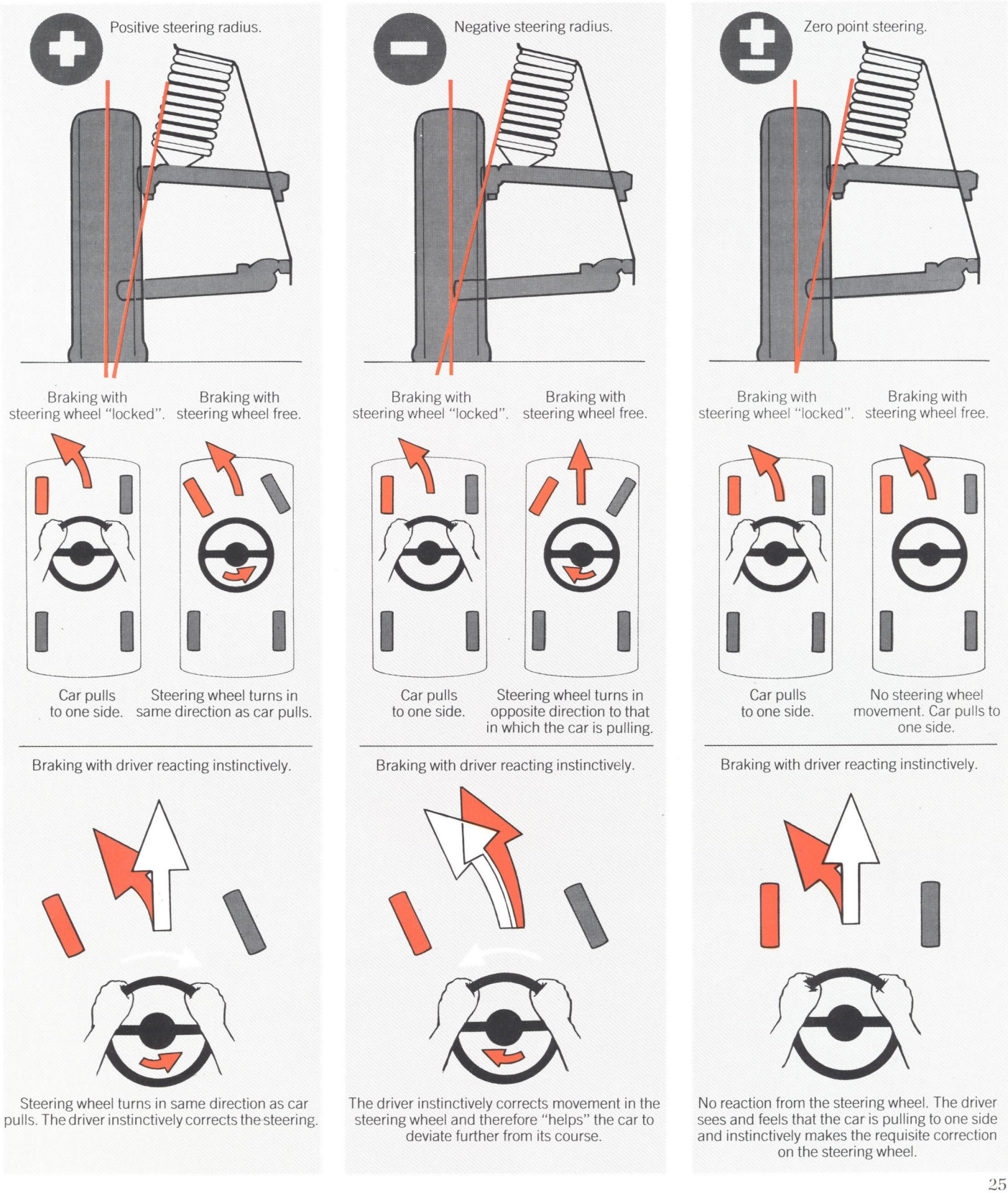
Steering geometry

Steering geometry varies from one make of car to another. It is generally described in terms of a positive or negative steering radius, or zero point steering. Let us see the effect that these different steering geometries have on the reactions of the car and the driver when a front tire suddenly bursts. When this happens, the driver is likely to either:

- brake, keeping the steering wheel firmly in the straight-ahead position,
- brake, while at the same time releasing the steering wheel, or
- brake and instinctively trying to correct any swerving of the car by using the steering wheel.

The Saab 900 has a slightly positive steering radius, and the response of the car to any movement on the steering wheel is therefore logical and consistent, even if one of the front tires should puncture. The same is true if the driver should brake when one of the two brake circuits is inoperative. The most common instinctive reaction of a driver is to attempt to correct the course of the car by steering.

In a Saab 900, any tendency of the car to pull to one side can be easily corrected without any appreciable effort on the part of the driver.



Driver's environment

"The Saab is blessed with one of the best dashboard layouts we have come across in recent times..."
(WHAT CAR?, GREAT BRITAIN)

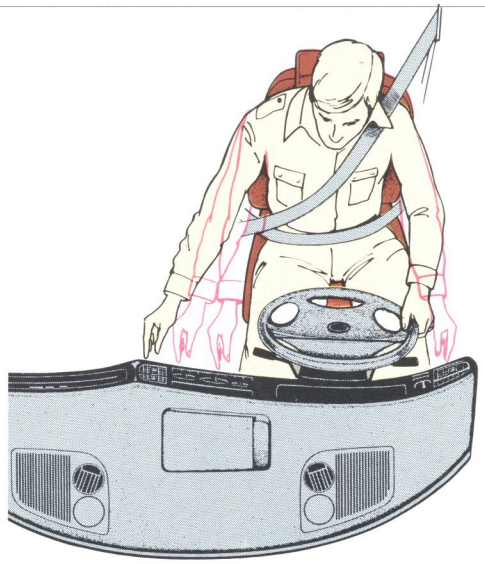
It is vital that a driver can make any requisite movement conveniently, safely and quickly. Bright lights, darkness, bad weather conditions, varying road surfaces, dense traffic and tight gaps – all of these are very demanding on the driver and thus on the driver's environment.

In the design of the Saab 900, special emphasis has been placed on the driver's environment by way of technical studies and the research carried out by Saab in collaboration with the Saab-Scania Aerospace Division, and various universities. The result is a "cockpit" which is functional and of sound ergonomic design.

The driver can reach all the controls without altering his position or taking his eyes off the road. Controls and instruments have been carefully arranged and are at a prominent height, where the information can be read at a glance. In addition, the logical design of the instruments substantially reduces the risk of incorrect readings being made when the driver is under pressure or dealing with difficult conditions.

In the design of the Saab seats, Saab worked in cooperation with medical and physiological experts. The goal they set themselves was that at least 95% of all drivers would be able to adjust the seat to give them a comfortable and sound anatomical driving position. A relaxed driver is a safer driver.

Research conducted by aeronautical and military institutions has shown that a person's ability to think and act are impaired at low temperatures. Judgement and feeling are blunted and muscular movements less precise. A driver who is feeling cold is therefore a poorer driver. Thus, the electrically heated driver's seat in the Saab is more than an added comfort – it also makes an important contribution to road safety.



Sensible locations

A sudden change in the situation on the road may call for immediate use of the headlight flasher, horn or washers, or switching of the wipers to maximum speed. At such times, it is vital that the driver does not have to fumble for the controls, which may cause him to lose command of the situation. Consequently, all of the important functions are operated by means of stalks or switches that are within fingertip reach. The pattern of operation of the controls is based on simple, easily comprehensible logic.

For reasons of convenience, the ignition key is located with the handbrake and gear selector lever between the seats. Further, the handbrake should also be in a position where it can be used by the frontseat passenger in an emergency, which is another reason it is located between the seats.

The washers and wipers for the windshield are operated by the same stalk on the right-hand side of the steering column. From the neutral position, the stalk can be moved to select the following functions:

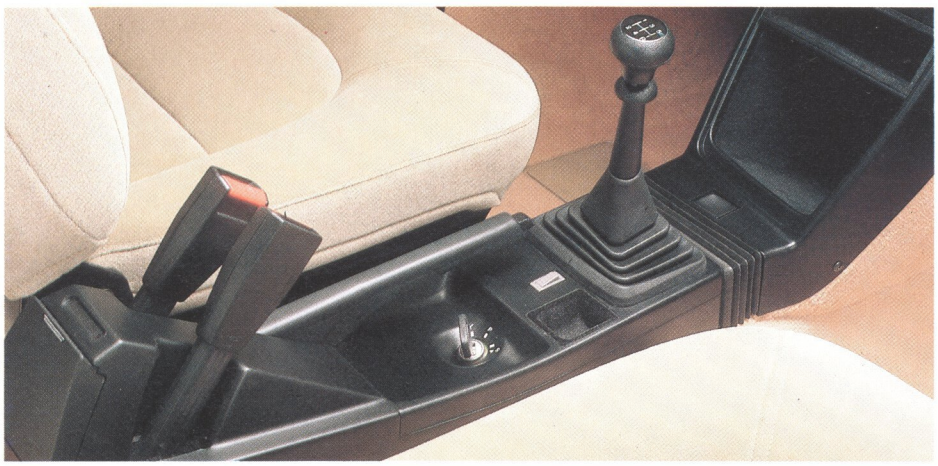
1. Windshield wipers, intermittent operation
2. Windshield wipers, low speed
3. Windshield wipers, high speed
4. Windshield washers. When the washers are switched on, the wipers will automatically make 3–5 sweeps. The stalk springs back to neutral position when released.

The washer fluid container has a capacity of 6.3 quarts and will normally only need filling in conjunction with refuelling.

Easy-to-read instruments

Instruments with round dials are fitted as standard in civil and military aircraft throughout the world to display important information that must be noted quickly. Tests have shown that it is easier to observe changes in the position of a large pointer quickly and correctly by peripheral vision than it is to observe changes in figures displayed in a digital instrument.

The Saab 900 has large, round instruments, with white symbols and yellow/orange-colored pointers against a matt black background. The instruments are deeply recessed and therefore do not cause reflections in the windshield or

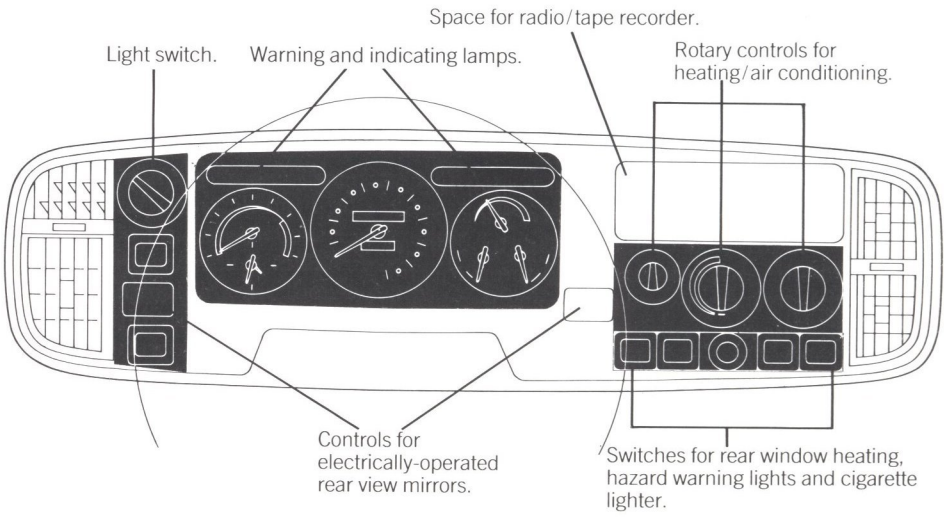


INSTRUMENT PANEL SAAB 900 TURBO

windows at night. The instruments and controls are illuminated indirectly by means of a green light. Green has proved to be the most favorable light for the driver faced with the lights of oncoming traffic and provides the equivalent of daylight vision in the dark. Red lighting is totally unsuitable as it could be confused with warning lights on other vehicles or on the instrument panel. The warning and indicating lamps are not visible – the colors and symbols only appear when the lamp lights up. All switches have built-in lighting, which illuminates the symbols indicating their function.

The front-seat passenger (or a driver who is unfamiliar with the car) should not be able to turn off the headlamps inadvertently while the car is being driven. For this reason, the light switch is operated by a knob located on the left side of the steering wheel (away from the passenger) while switches and controls for the radio, rear window demisting, and the like are located on the opposite side. This arrangement is to be adopted as an international standard.

The instrument panel incorporates 16 warning and indicating lamps, some of which are spare in readiness for future functions. There are also a number of spare pushbutton switches.



Lighting and visibility

"The Saab headlamps are undoubtedly one of the most effective available on the market..."

(MOT, WEST GERMANY)

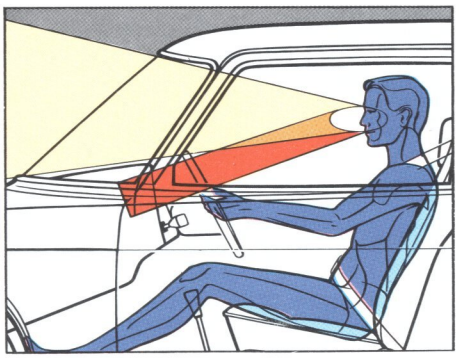
The large, curved windshield and the swept back windshield pillars provide a broad field of forward vision. The ample adjustment for height of the driver's seat ensures that even a driver of short stature will have good all-round visibility and a good general view of the instruments and controls.

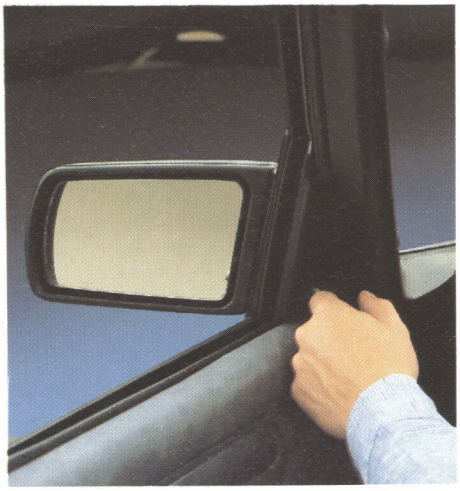
The exterior rear-view mirrors are adjustable from inside the car and, on 900S and Turbo models, the adjustment is electrically operated. The rear-view mirror brackets are fitted to the door frame with a spring loaded system for pedestrian safety.

The windshield wipers are of special asymmetrical design to achieve the maximum swept area. The wiper on the passenger's side does not encroach on the driver's normal field of vision. The windshield washers have two jets on the driver's side and one on the passenger's side.

The large sun visors can be unclipped and swung parallel to the side window. The internal rear-view mirror is of the anti-dazzle type.

An electrically heated rear window is standard. The electric heating for the rear window and the effective air defrosting quickly clear the windows for good all-around visibility under the worst winter conditions. The aerodynamic styling of the body helps to keep road dirt or snow away from the rear window, maintaining visibility even under very difficult conditions.





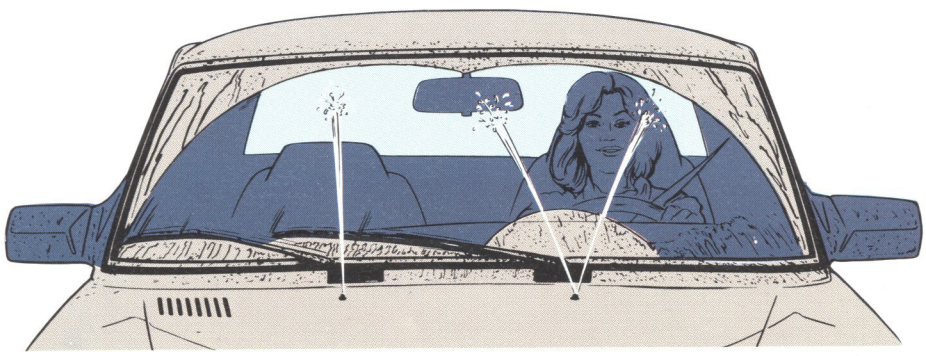
Halogen sealed beam headlights are fitted as standard equipment on all models. These lamps provide up to twice the light brightness on high beam as compared to conventional sealed beam systems.

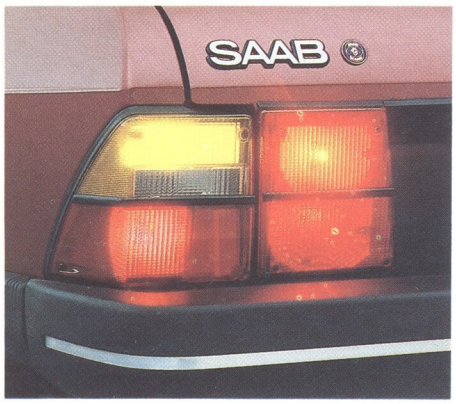
To see and to be seen

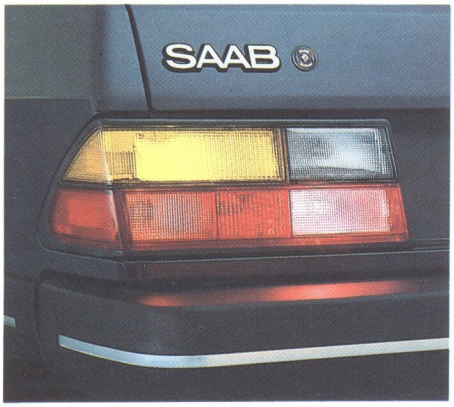
The large, front side-light fittings are "wrapped" around the corner of the car, so that they are clearly visible from the side. As they are located fairly high, they are less liable to fouling when the car is driven on wet roads and are less likely to be damaged in minor collisions.

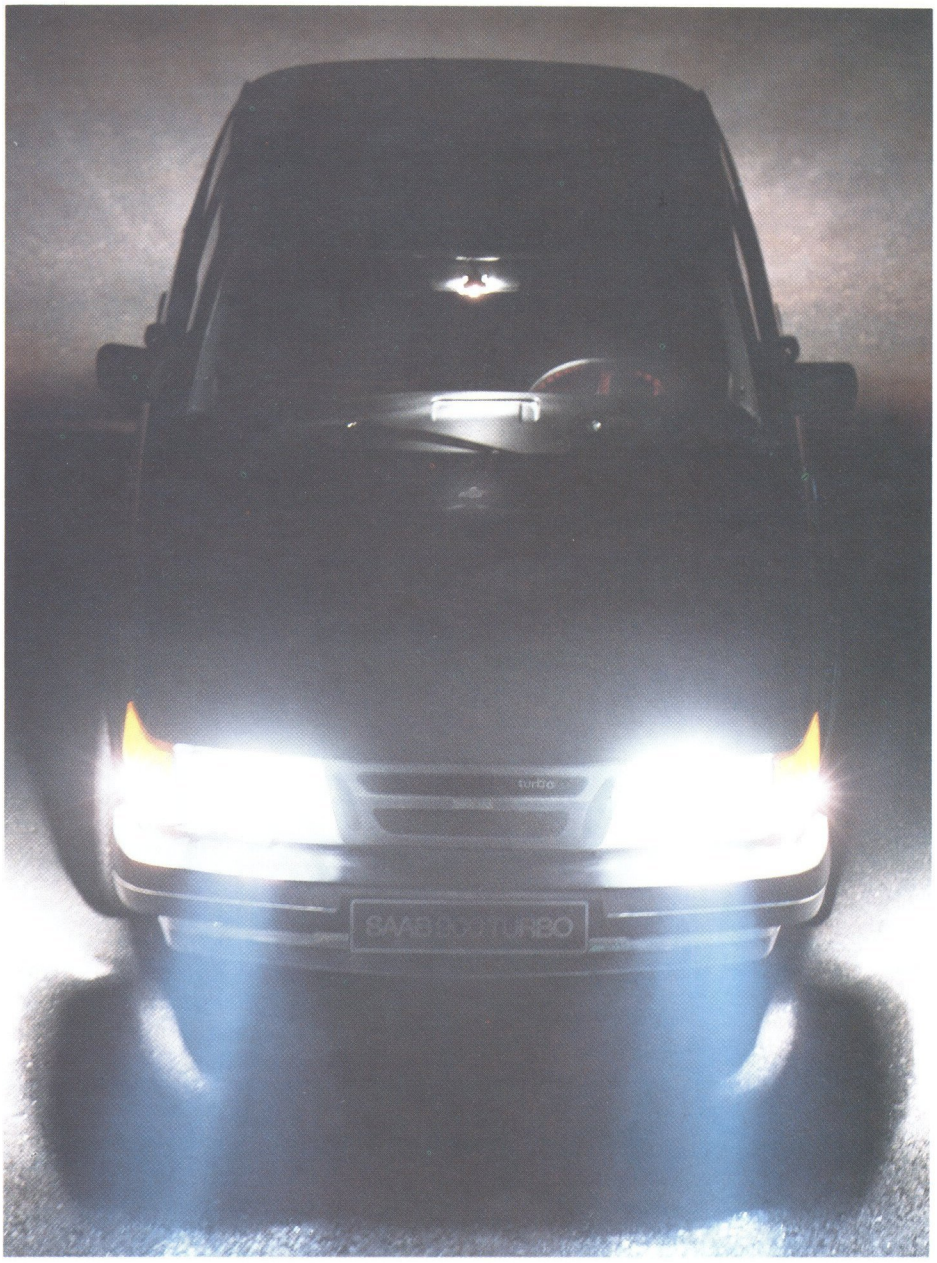
The large amber direction indicator lights and side marker lamps are contained in the upper half. They are visible over a very large sector.

The windshield washers have two jets on the driver's side and one on the passenger's side.









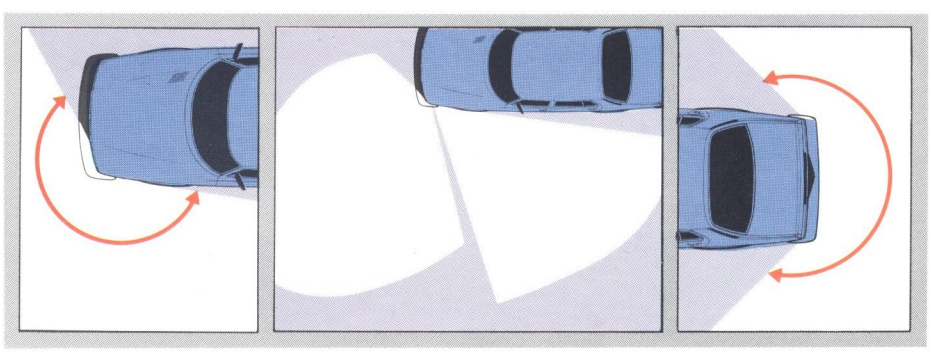
The lower half of the cluster of lights incorporates two functions: cornering lights and side guidance reversing lights. Parking lights are provided inboard of the headlamps on U.S. models.

Because of their high location, the indicators are also clearly visible to the driver of a bus or truck, and therefore make a positive contribution to road safety, especially on multi-lane roads. All Saabs are fitted with side guidance reversing lights which come on automatically when reverse gear is selected.

These lights illuminate an area on either side of the car, facilitating reversing in tight spaces, such as in a garage or parking lot.

The rear lights are designed so that all of the functions will be clearly visible to other drivers, even diagonally from the side. Dual tail lights and brake lights are fitted on either side of the car, for greater reliability and road safety.

The indicator lights are visible within a sector of no less than 235°.



Body and interior

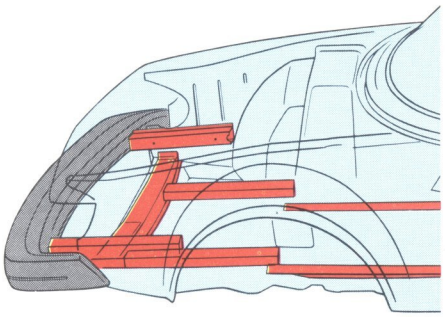
"...exceptionally well equipped from the safety aspect..."

(AUTOZEITUNG, WEST GERMANY)

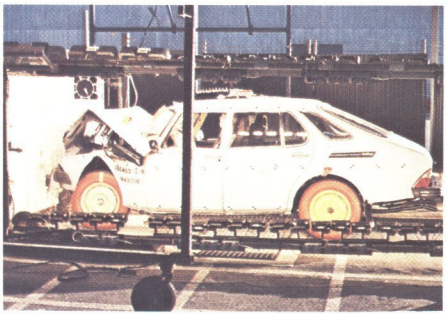
Maximum safety for the occupants in the event of a collision is no longer just a matter for the legislators – today the issues concern solicitude and moral rights. In this context, Saab is often cited as a forerunner and an example for other manufacturers to follow.

For many years, impartial observers have regarded the Saab 99 as being one of the safest cars on the road. The Saab 900 satisfies the safety requirements by an even wider margin. The goals the designers set themselves have, in many ways, gone well beyond the legal requirements likely to be introduced during the 1980s.

Of course, many of the safety features in the Saab 900 depend upon occupant use of the restraints to provide the greatest level of protection available.



Welded collision beams transfer the energy to the fenders and wheel arches, thereby helping to restrain the engine from being forced backwards towards the bulkhead and passenger compartment.



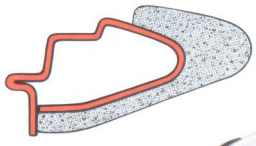
Tests on the new design included collisions with a barrier at speeds of 30 mph. The effects of three angles of impact were studied: 60°, 90°, and 120°. The requirements imposed by Saab included:

- that the windows should be retained in their frames,
- that the doors should remain closed but still open easily afterwards,
- that the hood should remain in position even when deformed,
- that the occupants (dummies) should not be thrown out of the passenger compartment.

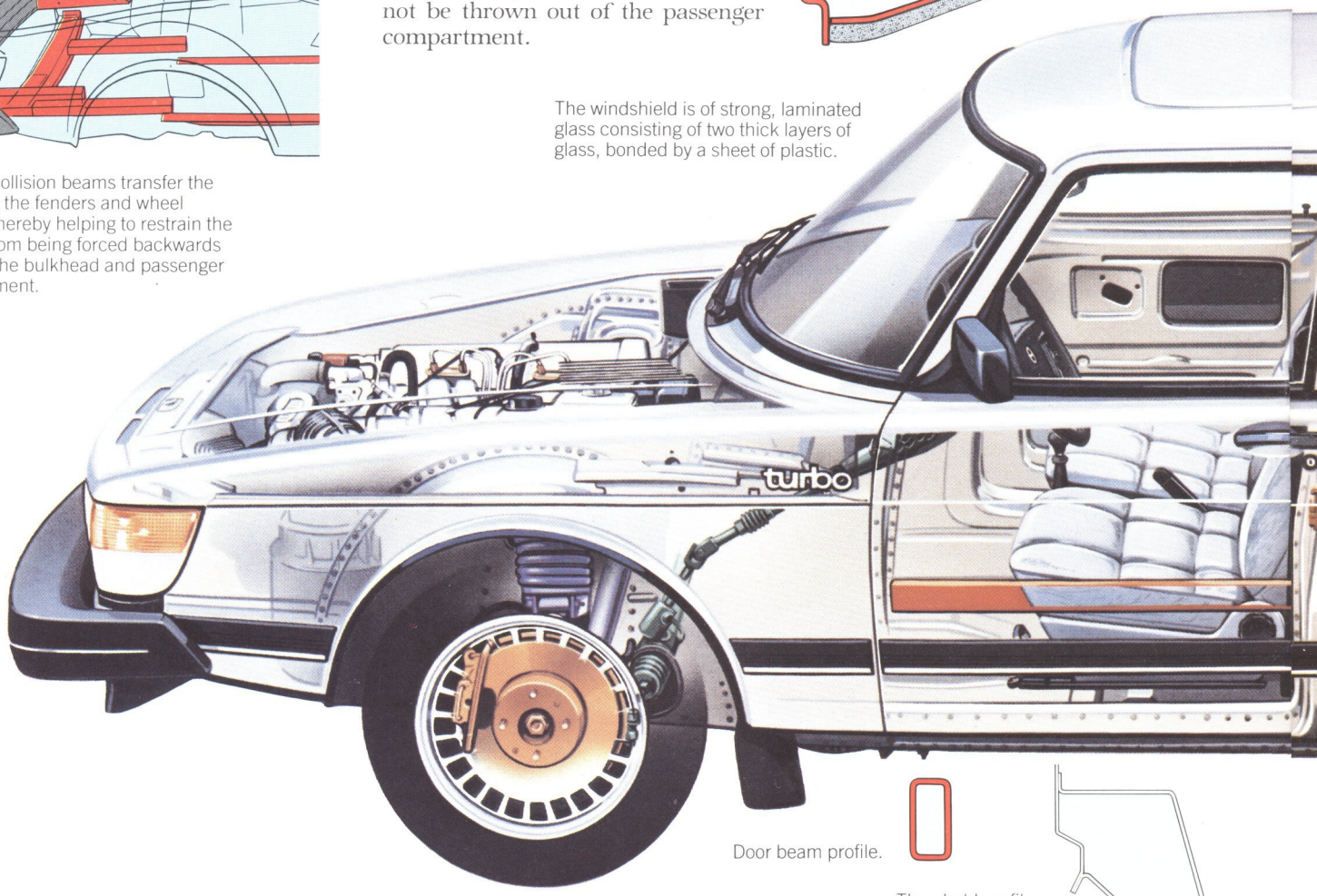
Many of the body panels and safety reinforcement members in Saab cars are much stronger than is usual in passenger cars. Stiffness in bending increases with the square of the thickness of the sheet metal (e.g. a 5% increase in the thickness of the metal will give $1.05^2 = 1.1025$, i.e. an increase in the stiffness in bending of 10.25%).

On the other hand, it is generally known that sufficient crush space is necessary to absorb the impact of a collision in a controlled manner. That is why some parts of the body and chassis are specially designed to deform and therefore "consume" as much as possible of the impact force in a collision.

The windshield pillars are made of rolled 0.10 in thick sheet steel sections which can effectively absorb any stresses applied to the front, sides or roof. These are also very well padded.



The windshield is of strong, laminated glass consisting of two thick layers of glass, bonded by a sheet of plastic.



Door beam profile.

Threshold profile.

The striker plates for the door locks are fitted with backing plates, to prevent the locks from jamming. This feature, together with the soft sections incorporated in the wheel arches and the adjacent fender edges, makes it easier to open the doors after the car has been involved in a head-on collision. This may well be made a legal requirement in the future. Still, as noted before, Saab's aim is to keep one step ahead where safety is concerned.

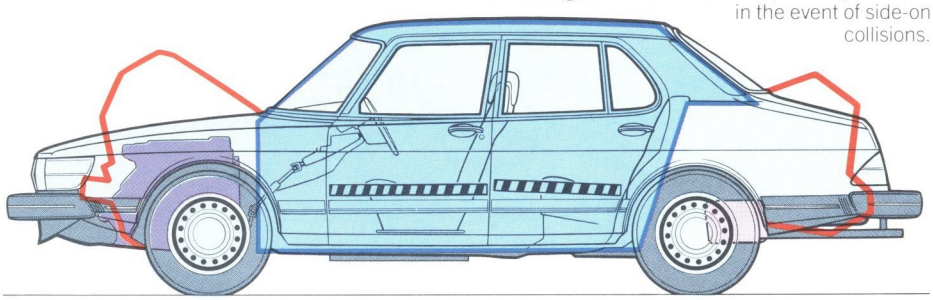
The hood of the car is hinged at the front and opened at the rear. This ensures that the hood cannot fly open when the car is travelling at speed, should the driver forget to secure it properly. The hood has special reinforcements front and rear, a buckling zone in the middle, and arrester reels at the back. All these will prevent the hood from being driven through the windshield in a collision.

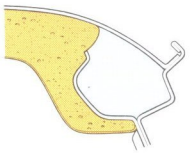
In the event of a head-on collision, the engine will be forced backwards at a downward angle and caught by the sturdy bulkhead. Most of the force of the collision will be transmitted through the sturdy, longitudinal beams and wheel arches to the windshield pillars, the bulkhead and its mounting.

In a side-on collision, the energy will be absorbed mainly by the sill, floor and door members, the thick and sturdy side panels, the bulkhead, the modestly profiled floor plate and the transverse tunnel below the back seat.

The unusually sturdy windshield pillars and side pillars, and the profiled steel member which encircles the roof, are essential components, designed to resist deformation of the steel safety cage should the car turn over.

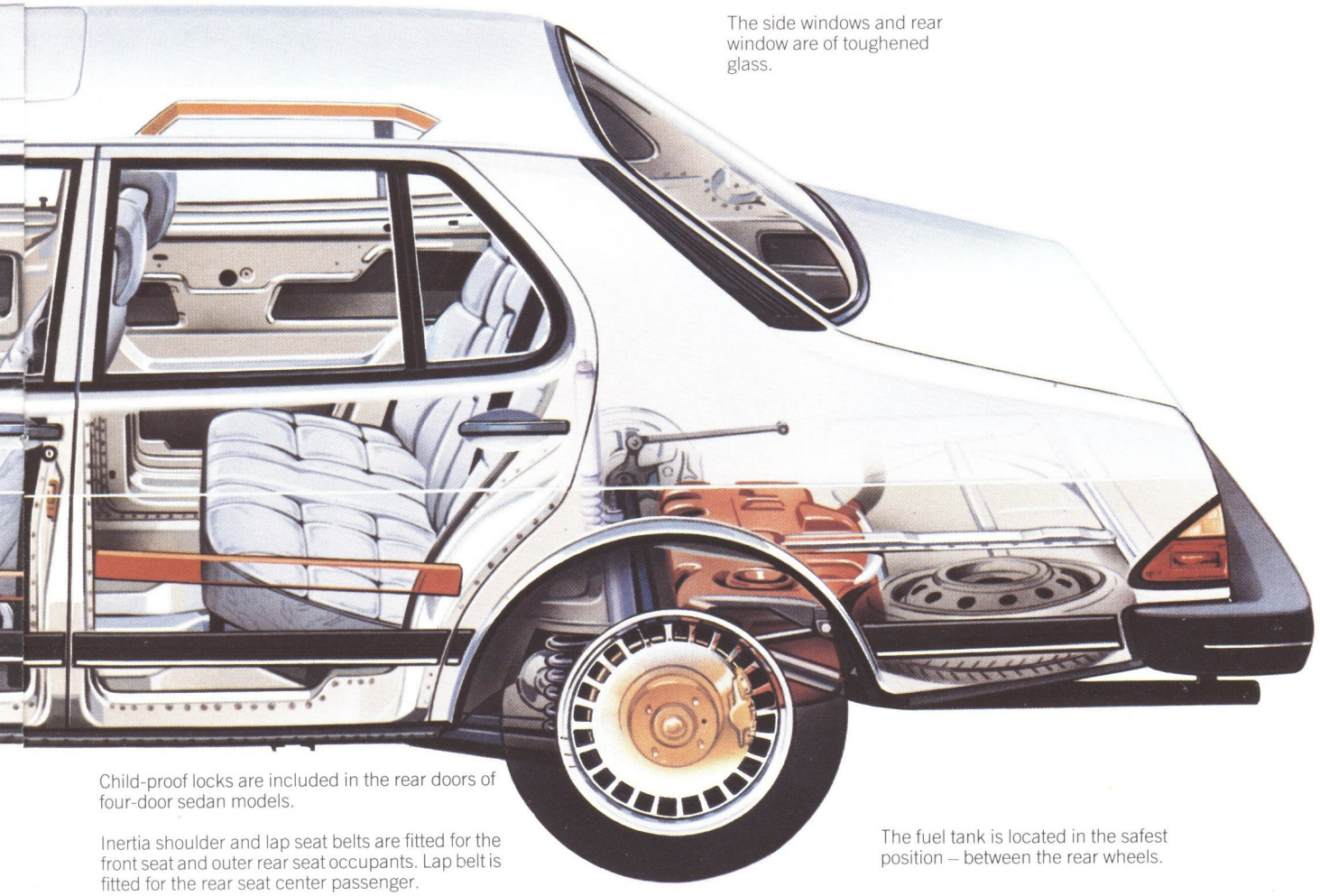
The Saab 900 has a safety body with deformation or "crumple zones" front and rear. The windshield pillars are unusually sturdy steel sections and the steel members incorporated in the roof, floor, sills and other parts of the body form a frame of solid steel around the occupants. Welded into the doors are strong steel members which provide protection in the event of side-on collisions.





An internal stiffener, with a slightly rounded cross-section, encircles the roof. This is also well padded.

The side windows and rear window are of toughened glass.



Child-proof locks are included in the rear doors of four-door sedan models.

Inertia shoulder and lap seat belts are fitted for the front seat and outer rear seat occupants. Lap belt is fitted for the rear seat center passenger.

The fuel tank is located in the safest position – between the rear wheels.

Safety:
Body and interior

"Instead of fashionable novelties, the body offers high passive safety... An even greater number of safety features will be found inside the car..."
(AUTO MOTOR UND SPORT, WEST GERMANY)

The padding in a car should be solid enough to prevent "bottoming" yet must also be matched to the retardation that the human body can withstand.

Barrier-collision tests at various angles, drop tests and skid tests are among those employed by Saab engineers to ensure that the inside of the car more than meets the specified requirements.

The padding on the windshield pillars can withstand a very heavy impact without "bottoming". The swept back design of the windshield, coupled with the ample distance between the occupants and the windshield, means that there is very little chance of the front seat passenger or driver hitting the windshield, provided that they are wearing their seat belts.

The compressed glass fiber roof lining is covered with velour and is fire-resistant. This impact-absorbing lining extends over the reinforcing members and the roof edges. This safety feature is still absent in most other cars.

In four-door models, the door trim consists of a padded fiber board panel. In two- and three-door models, the door lining consists of a one-piece foam moulding.

The handles are recessed into the door panels to prevent them from causing injury in the event of a collision, and to prevent the doors from being opened inadvertently while the car is moving.

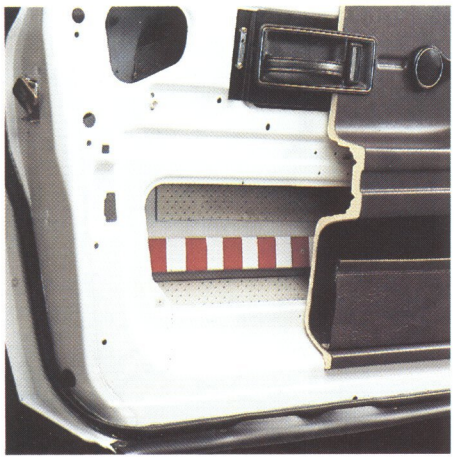
The lower part of the dashboard in the Saab 900 is specially designed to prevent serious injuries to the knees, thighs and hips. The protection consists of an energy-absorbing section of stiff polyurethane covered with foamed PVC film. Stiffening inserts are moulded inside the layer of polyurethane foam.

Seat belts are provided for all occupants, which when properly worn, reduce the risk of serious injury in the event of an accident or emergency maneuver.

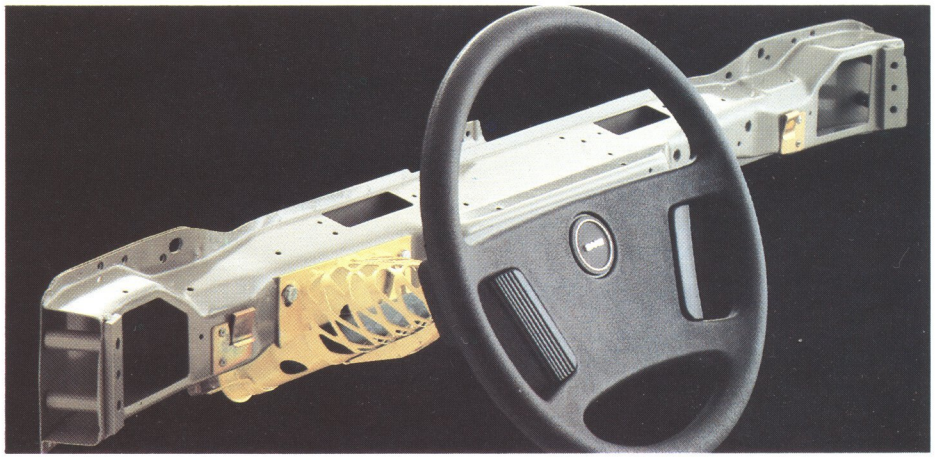
Extra protection for the neck vertebrae

If a car is hit from behind, the seat must effectively arrest the backward movement of the body and the head. It is especially important that the backward angle of the head be restrained before it becomes too great. If the angle between the head and the torso should exceed 120°, the neck could sustain serious injury. Tall people are particularly prone to this danger. Saab designers therefore based their work on the tallest test

Sturdy, longitudinal members are welded into the side doors. In two- and three-door models, the panel is designed to protect the occupant's hips by absorbing the impact and distributing the load. The door lining consists of a one-piece polyurethane-foam moulding, lined with tough vinyl. In the event of a side-on collision, the panel will break in predetermined places.



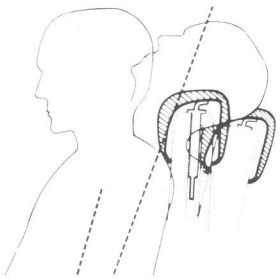
The instrument panel is backed by a deformable sheet steel body covered with softer impact-absorbing material.



dummy existing: the 99th percentile. Only one per cent of the population is taller.

The head restraint consists of a foam material which is moulded around a flexible plate. If the head compresses the padding sufficiently to "bottom" on the flexible plate, the angle of the head will still not be greater than about 40°.

Tests with dummies have proved the excellent energy-absorbing properties of the head restraints. When the head restraint was struck from the top, 50G was recorded for a period of 3 milliseconds. The speed was 15 mph. In similar tests where the head restraint was struck from the front or behind, a value of 31G was recorded. The acceptable value appropriate to the tests, given in the relevant standards, is as high as 80G.

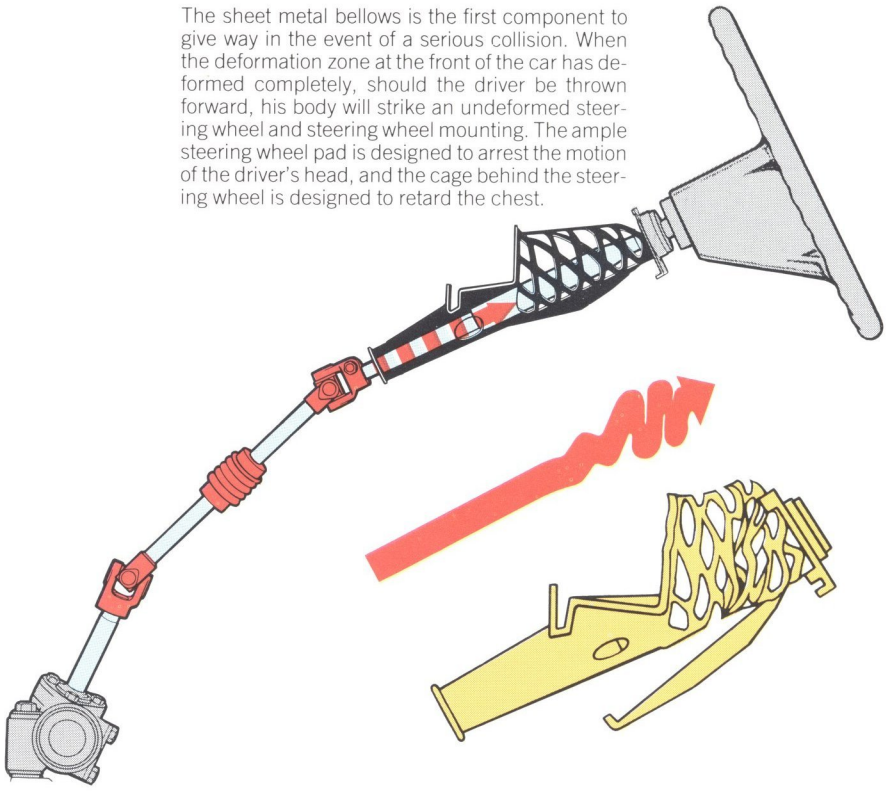


Among the safest in the world

The design of the steering wheel and steering column in the Saab 900 is among the safest in the world. Many features of the designs are patented. The steering column consists of three sections, connected by universal joints. The top section of the steering column is telescopic and is fitted inside a closely perforated sheet steel cage. The next section incorporates a patented sheet metal bellows, designed to deflect the steering column when an excessive load is applied. The third section, between the sheet metal bellows and the steering box, comprises a rigid shaft and a universal joint.

The steering gear is located well back in the engine compartment and extensive deformation of the front of the car must take place before the steering column will be affected in a collision.

The sheet metal bellows is the first component to give way in the event of a serious collision. When the deformation zone at the front of the car has deformed completely, should the driver be thrown forward, his body will strike an undeformed steering wheel and steering wheel mounting. The ample steering wheel pad is designed to arrest the motion of the driver's head, and the cage behind the steering wheel is designed to retard the chest.



The steering wheel consists of a tough resilient frame, covered in an impact-absorbing layer of polyurethane. The center pad is made up of effective energy-absorbing foam padding.

The front seats also provide good protection for the back seat passengers in the event of a collision, due to the impact-absorbing padding and the absence of any sharp edges or corners.

The safety padding below the dashboard is configured to reduce knee, thigh and hip injuries in frontal collisions.

All materials used in the interior are fire resistant or self-extinguishing.

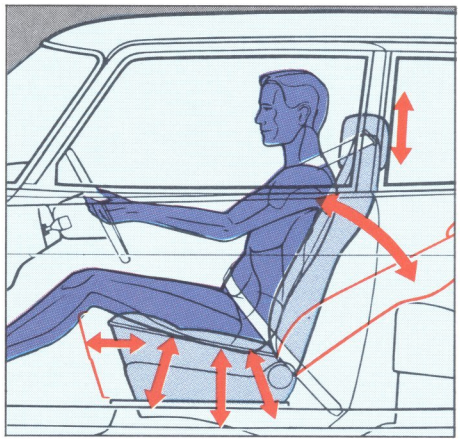
Driver's seat

"It has probably the best seats available anywhere today..."

(AUTOCAR, GREAT BRITAIN)

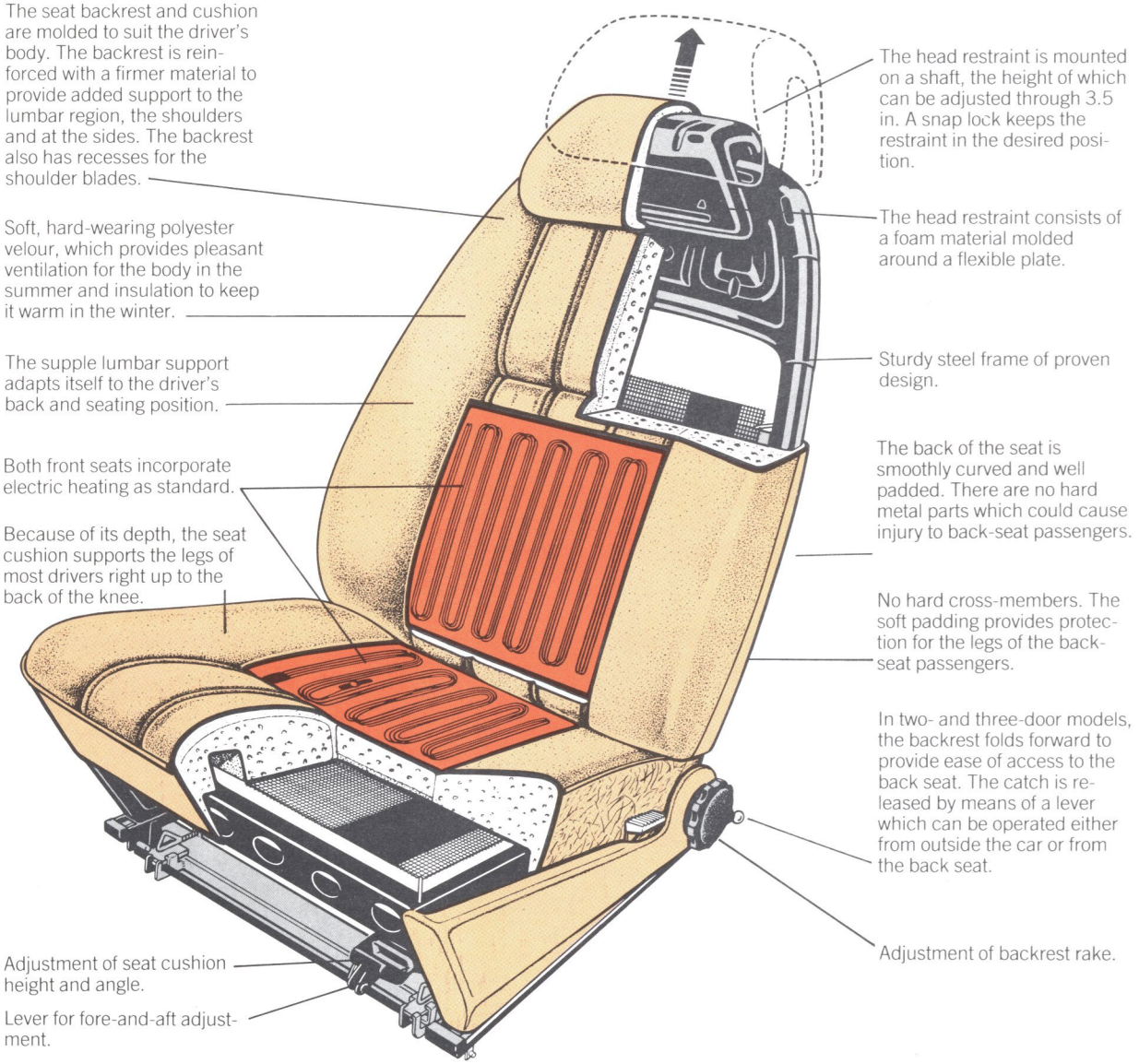
The seats in the Saab 900 are among the most comfortable to be found in any car, and are especially designed for comfort on long journeys. There is ample fore-and-aft adjustment, and the seat can even be moved from outside the car, to make access easier for a back-seat passenger. The backrest is adjustable steplessly down to a fully reclining position. In two- and three-door models, the backrest can also quickly be folded forward.

A truly exclusive feature is that the height of the driver's seat is adjustable. Moreover, the driver can adjust not only the rake of the backrest but also the slope of the seat cushion, by means of a lever. No tools are needed.



Electrically-heated front seats are fitted as standard on all 900 models. The comfort of a Saab for long journeys has been extolled in the motoring press the world over. But the anatomically designed seat also encourages relaxed and safe driving for hour after hour. The design of the Saab seat is the product of orthopedic and ergonomic expertise coupled with exhaustive testing.

The molded design and firm padding of the backrest provide the best comfort



in the long run. Thicker and softer padding may well feel more comfortable for short periods, but this usually results in uncomfortable swaying of the body after a while. This means that the muscles have to work harder to prevent the body from swaying about, especially when the car is travelling fast on winding roads.

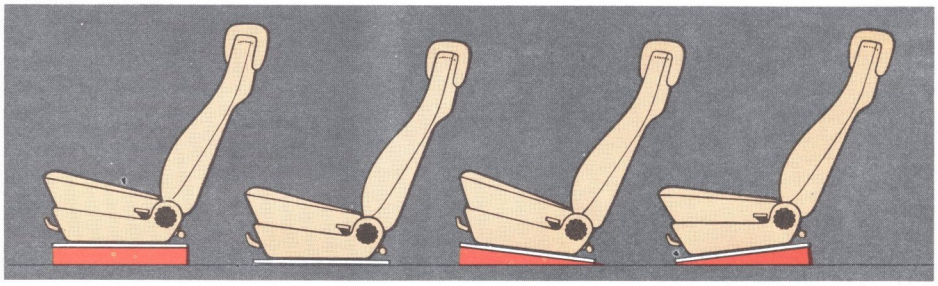
To provide proper support where it is needed most, the backrest and seat cushion have foam-rubber elements, with varying springing effects, housed in a frame of solid foam rubber. The lumbar support is specially designed to adapt itself automatically to the body and position of the driver.

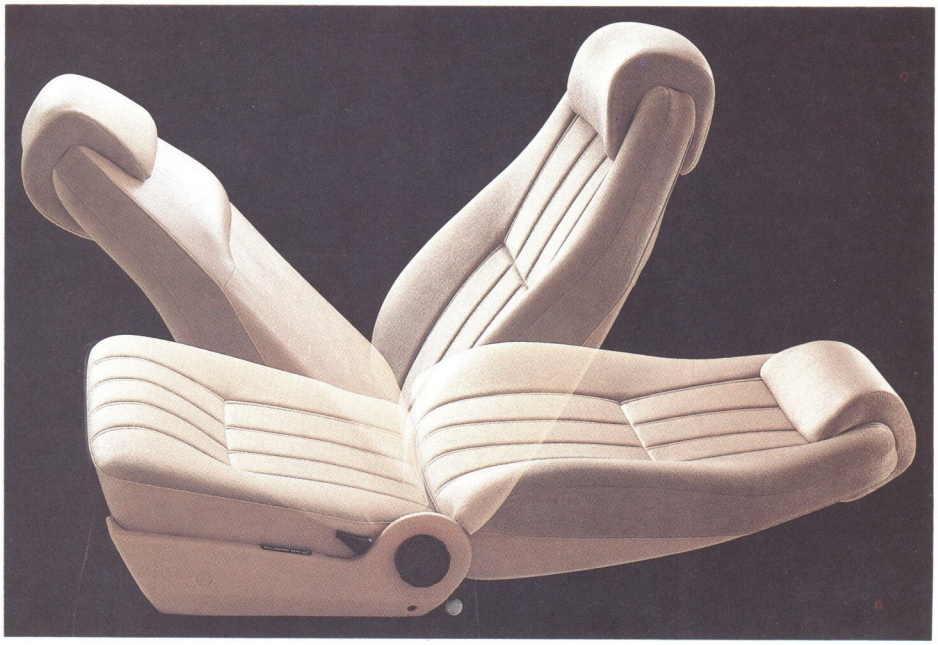
Electrically heated

To many people, winter is a time of suffering, as the cold weather exacerbates back trouble and rheumatism. Such conditions are often caused by people sitting repeatedly and for long periods in cold car seats.

When a driver seats himself behind the wheel of a cold car on a winter's day, it may take twenty minutes or more before his body-heat counteracts the unpleasant chill of the seat.

Saab seats are electrically heated. Both the seat cushion and the backrest incorporate heating elements, housed in net pockets, with aluminum foil to reflect the heat upwards. When the temperature of the seat cushion is below 57°F, power will automatically be supplied to the heating elements as soon as the ignition is switched on. Tests have established that the seat cushion is generally most comfortable at a temperature of 82°F. When this temperature is reached, a built-in thermostat automatically switches off the heating elements.





The rake of the backrest of both front seats can be adjusted steplessly. This feature not only provides for passenger comfort, but is also a practical feature for loading and carrying long or bulky items.

Occupant comfort

"A Saab is a first-class traveling compartment . . ."

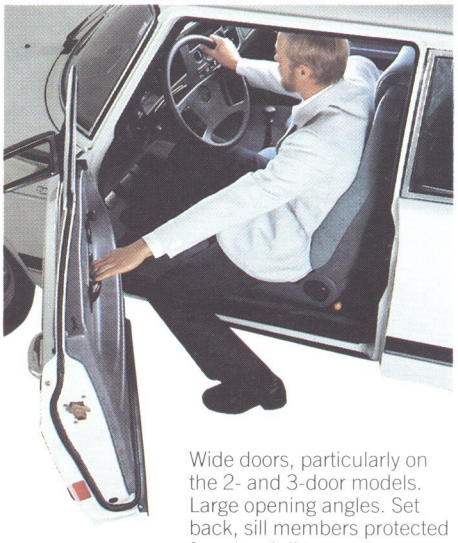
(CAR AND DRIVER, U.S.A)

The interior of the Saab 900 is appreciably larger than the exterior would suggest. In view of the wide doors and the large opening angle, the occupants can enter and exit the car with ease. The doors protect the sill members from road dirt. In addition, the sills are low and set back as a further contribution to ease of entry and exit. On the four-door models, the rear door frame follows the contour of the backrest.

On the two- and three-door models, the front seat backrest can be folded down for convenient access to the back seat. The latch can be released with the knee or foot to enable the backrest to be folded down, even when the person has both hands occupied carrying luggage, etc. If necessary, the front seat can easily be moved forward even from the outside of the car.

A grab-handle is provided below the glove compartment, to facilitate fore-and-aft adjustment of the passenger's seat when in the seated position.

The interior lighting is switched on automatically when either of the side doors is opened. Separate switches are provided on the center console and on the roof lamp on the left-hand side of the car.



Wide doors, particularly on the 2- and 3-door models. Large opening angles. Set back, sill members protected from road dirt.

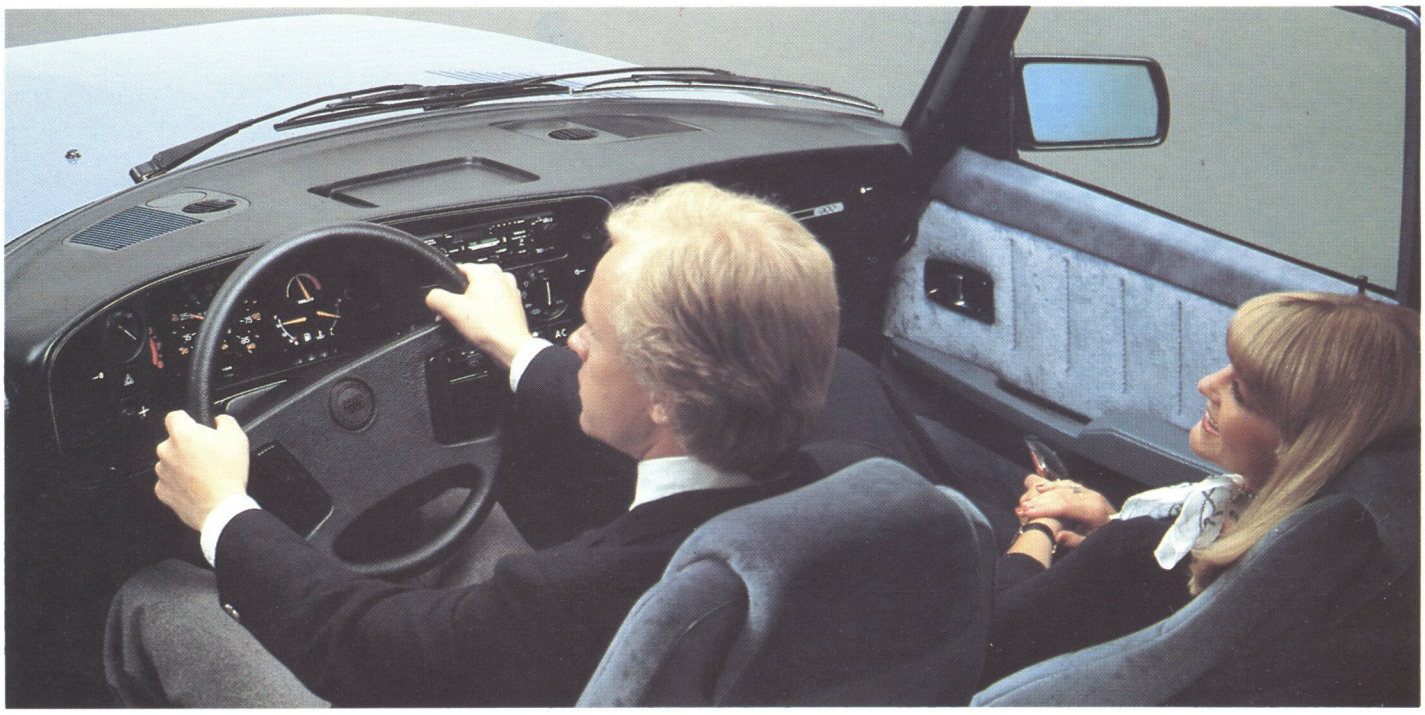
In addition to the roof lamp, a map reading lamp is provided behind the interior rear-view mirror – in a location where it will not dazzle the driver. A lamp is also provided for lighting the ignition switch.

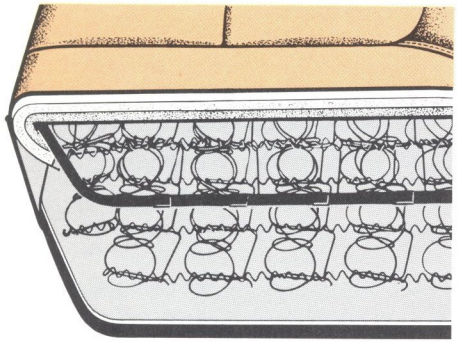
A special opening is provided for the installation of a radio/casette tape player in 900 models. Additionally, all 900 models include factory fitted front stereo loudspeakers, and provision for fitting rear stereo speakers. All 900S and Turbo models include a four speaker electronic AM/FM stereo/cassette sound system with electric antenna as standard equipment. Turbo models also have a seven band graphic equalizer, mounted in a special front console, as standard. The front console is also standard on the Saab 900S two-door. It provides additional storage space and/or space for a mobile telephone, extra gauges, supplemental audio equipment, a graphic equalizer, and the like.

Low sound level

The sound level in a Saab 900 is lower than in the majority of other cars in the same price and performance class as illustrated by tests carried out by the motoring press. This is the result of careful insulation and a variety of measures designed to suppress the sound at its source.

As an example, the engine is mounted in preloaded rubber elements enclosed in metal cases. The steering gear is rubber-insulated.





The choice of ventilation fan has been guided by sound level considerations rather than capacity alone. The curved windshield and low, smooth front provide exceptionally good aerodynamics and thus a low level of wind noise.

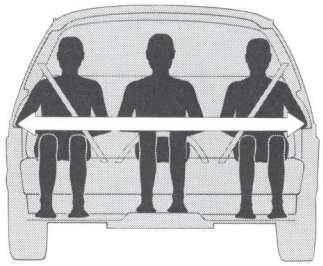
The firewall between the engine compartment and the interior is insulated on the engine side, and the insulation is covered with a thin, pressed plate. The hood insulation consists of self-extinguishing polyester foam, with a fluted surface for maximum absorption of road noise and engine sound. In the interior of the car, the carpet is backed by a thick layer of fluted polyester foam, bonded to a bitumen panel. Further, the roof lining of glass fiber and the side trim (on two-and-three-door models) also have sound-deadening properties.

Motoring journalists throughout the world claim that the Saab 900 is equipped with one of the most comfortable front seats on the market. But the backseat comfort is also high. The backseat cushion consists of more than 400 springs. The seating comfort is comparable with that of a truly exclusive armchair.

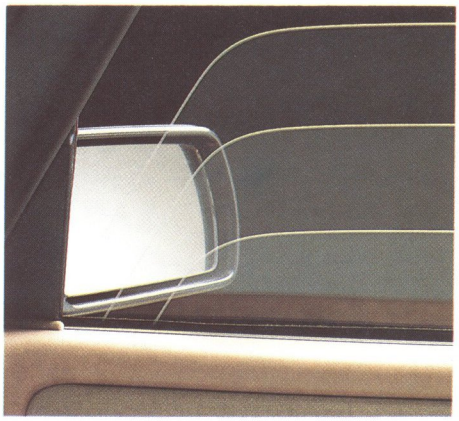
The seats are upholstered with a wear-resistant polyester velour, which is always comfortable, in summer or winter.

On the 900S and Turbo, the backseat backrest is slightly contoured for the two outer positions, and provided with a folding center arm-rest. Two soft and well-formed headrest cushions round off the comfortable interior in these models. The cushions consist of foamed material, molded around an energy-absorbing backing plate. The cushions can easily be removed before folding down the back-seat backrest.

A special equipment package, the Exclusive Appointments Group, is available as an optional extra on three-and four-door Turbo models. In addition to the leather upholstered, deep contour seats (shown on page 35) the package includes an electrically operated sunroof, and fog lights.



Electrically-operated windows on 900S and Turbo models.



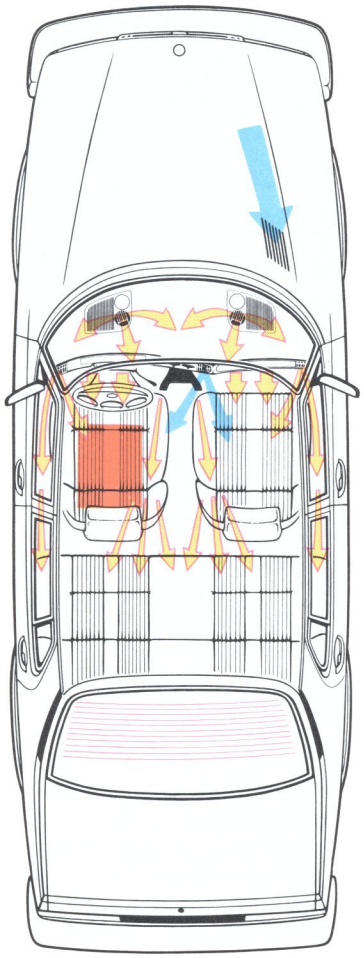
Heating and ventilation

"The heating and ventilation system is among the very best on the market..."

(AUTO MOTOR UND SPORT, WEST GERMANY)

To some extent, the engineers have worked along entirely new principles in designing the heating and ventilation system of the Saab 900. The work has resulted in a system with an extremely high capacity and rapid response after starting with a cold engine in cold weather.

The system delivers a uniform flow of air at the preset temperature level – regardless of the speed of the car. Tests have shown that when the system is set to maximum capacity and the engine is running at idling speed, the air delivered, within five minutes of starting, will be at a temperature which is 90°F higher than that of the outdoor air. During these tests, the car was first cooled down to –20°F.



100 liters per second

The external air flows through a ventilation air filter to the heat exchanger, where it is heated before being discharged into the interior of the car. The number of air outlets and their locations are of major importance to the sense of comfort. An air velocity in excess of 1 ft/sec is experienced by the human being as a draft. The Saab 900 is equipped with vacuum-controlled dampers which distribute heater controlled fresh air through 12 outlets arranged at strategic points of the interior. In addition, two separate panel outlets can provide unheated fresh air. The many outlets together ensure gentle but very effective flow of air through the interior.

When the fan is running at maximum speed, 100 liters of clean, fresh air are circulated through the interior of the car every second. In order to achieve maximum evacuation capacity – without the risk of exhaust gases being drawn into the car – Saab engineers have tested the locations of the air outlets in a wind tunnel.

Simple and logical

The system in the Saab 900 is logical and easy to understand. It has high precision and is easy to adjust. The heating and ventilation system is semi-automatic. The air outlets on the instrument panel can be oriented in the required direction and the air flow can also be varied from zero to maximum by means of a damper. The heating and ventilation controls are as follows:

- Fan knob with three speed settings.
- Temperature control knob.
- Air distribution knob. The knob has seven accurate settings arranged in a programmed, logical order, to operate vacuum-controlled dampers which distribute warm and cold air into the interior.

After starting from cold in the winter, the air distribution knob should be set straight up, the temperature knob to maximum and the fan to position 3. This provides maximum defroster action at the windshield and the side windows.

After a short time, the distribution knob should be turned one snap setting to the left. The air then is distributed equally onto the windows and towards the floor.

The next setting provides maximum heat at the floor. A gentle flow of air through the defroster outlets keeps the windows clear.

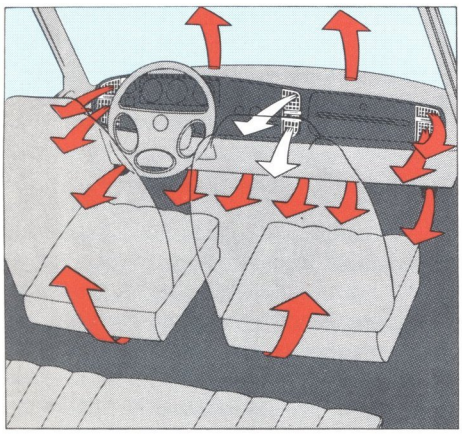
This setting provides maximum heat at the floor and, if required, a simultaneous supply of cold air through the two fresh air nozzles in the center of the panel.

These two settings route air through the panel outlets. Primarily designed for fresh air distribution during summer, these settings can also be used for heating in the winter. One is a comfort setting, while the other is a maximum setting with a higher fan speed.

0 In this position, all vacuum-controlled air dampers are closed and the fan is switched off.

Fresh air outlets

The fresh air nozzles in the center of the panel are features which actively affect the sense of well-being and safety on a long journey, particularly at night and during the cold season of the year, when the heating system is used. The driver and the passenger can direct a flow of cool air onto their faces, while warm air flows through the remainder of the interior.



Air conditioning

Air conditioning is standard on all Saab in the U.S. Designed specifically by Saab, the unit efficiently delivers cool dry air to the interior. An "AC" switch below the air distribution knob actuates the system. Air conditioning can be used in any one of the air distribution settings described to the left. The air is admitted through the ordinary ventilation outlets.

All 900S and Turbo models are equipped with a sliding steel sunroof. Opening and closing the sunroof is quick and easy. On Turbo models with the Exclusive Appointments Group, the sunroof is electrically operated.

The large, impact-absorbing sun visors have a sturdy two-point mounting, but can be released and swung to one side. The reverse side of the sun visor on the passenger's side is fitted with a vanity mirror.

The roof lining is made of molded glass fiber and is covered with a washable polyamide velour. The glass fiber provides sound and heat insulation.

All Saab models have tinted windows all round.

Practical features

"If there is a sedan with more usable interior space, more places to put things, more room to carry things, more space to haul things, more ways to store things without exposing them to prying eyes, we flat don't know of it..."

(ROAD TEST, U.S.A)

Saab was one of the first manufacturers to launch the hatchback style, a model which combines the best features of conventional sedan, coupé and station wagon. As compared to a station wagon, for instance, the body has a more elegant and sporty appearance, is more silent, has a rear window which stays cleaner due to more favorable aerodynamics, is more economical on fuel, and offers opportunities for concealing valuable luggage.

But many motorists still prefer the traditional sedan model. A practical refinement which the Saab 900 four-door sedan shares with the hatchback models is the "expandable" luggage compartment, a feature not available on most other sedans.

Interior

In two- and three-door models the side trim consists of a thick panel of injection-molded polyurethane foam, covered with vinyl. The trim is impact-absorbing and has good sound and heat insulating properties. It is very durable and easy to keep clean.

The wear-resistant velour covers of the front seats are provided with zip fasteners, and can thus be removed for cleaning (dry-cleaning is recommended).

Luggage compartment

The luggage compartment of the Saab 900 is one of the largest on the market: 21.3 cu.ft on the three-door models and 21.8 cu.ft on the two- and four-door models. By SAE standards, the figures are 14.9 and 14.2 cu.ft respectively.

The luggage compartment volume can easily be more than doubled by folding the rear seat. The conversion takes a few seconds and no tools are necessary. With the back seat folded, the load-carrying capacity is 56.5 cu.ft (53.0 cu.ft on two- and four-door models).

A well-protected lamp illuminates the luggage compartment when the rear door (or luggage compartment lid) is opened. The floor is completely flat and is covered with a tough, synthetic fiber carpet. The sides are lined with heavy-duty, molded textile carpet.

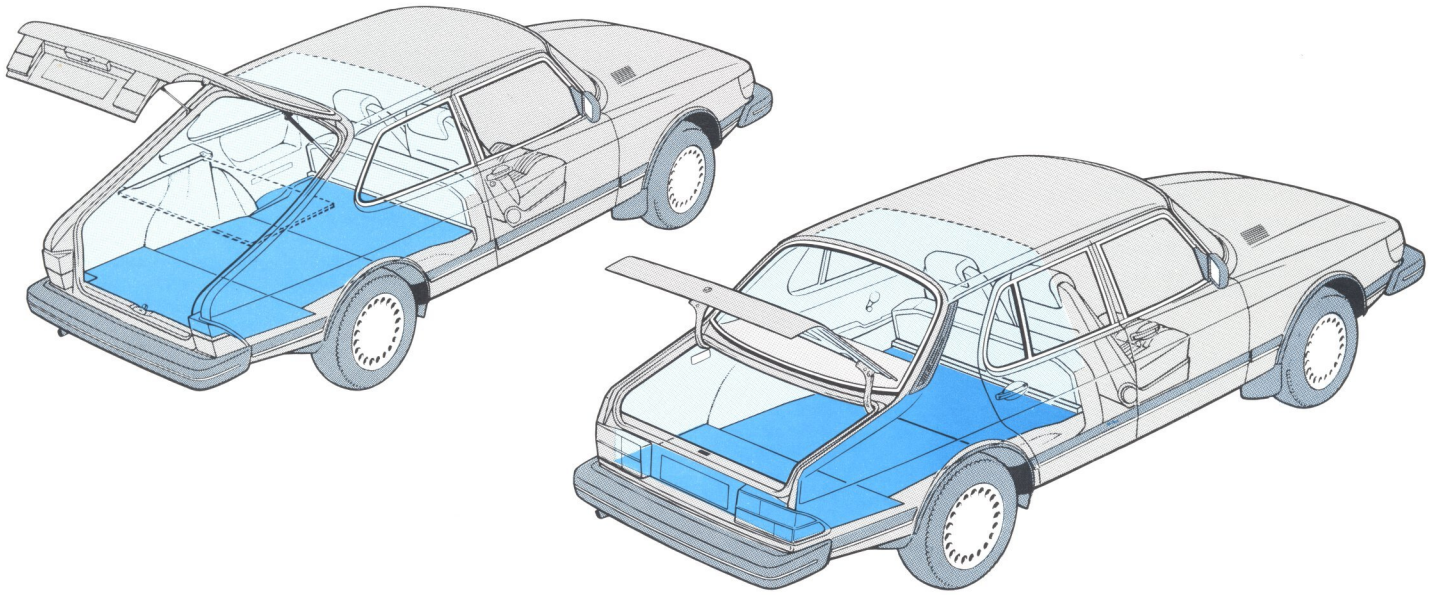
Hatchback special features

The substantial rear hatch on the three-door model makes it easy to carry even heavy and bulky items, and the open rear door offers a good rain shelter. The headroom below the door is no less than 71 in.

As soon as the rear door has been opened and lifted to a horizontal position, two gas springs take over and lift it gently to the fully raised position. The vertical height of the rear door opening is 31.5 in and the width is almost 40 in.

Due to the absence of a rear sill, the height of lift for loading is only 20 in. The sturdy, rubber-covered bumper is flush with the floor and can be used as a support on which long and heavy goods can be slid into the car.

During loading, the parcel shelf can be locked in the raised position by means of a spring-loaded latch. During the winter, the raised parcel shelf keeps cold drafts from entering the interior of the car. The parcel shelf can also be removed entirely if the full height of the



car is required for loading. The reverse side of the shelf can serve as a practical "table-top" for a picnic.

Locks and keys

The Saab 900 has a single key for all locks, including the ignition. The key is symmetrically cut and can therefore be inserted either way. This is particularly practical at night.

The ignition key can only be removed when reverse gear is engaged (manual transmission) or when the selector lever is in Park (automatic transmission). The gear lever is then locked, which reduces the possibility of theft.

Another refinement is that the headlamps are connected through the ignition switch. They are therefore switched off automatically as soon as the ignition is switched off. This prevents the battery from being discharged if the driver forgets to switch off the lights.

All 900S and Turbo models are equipped with a central locking system. The locks of all doors and the trunk lock are operated electrically when the door on the driver's side is locked or unlocked. However, the passenger's door and the luggage compartment lid can still be opened separately by means of the key.

Stowage pockets and compartments

The glove compartment is lockable and illuminated with a soft, green light which will not dazzle the driver at night.

The front doors are equipped with pockets, which are extra-roomy on two- and three-door models.

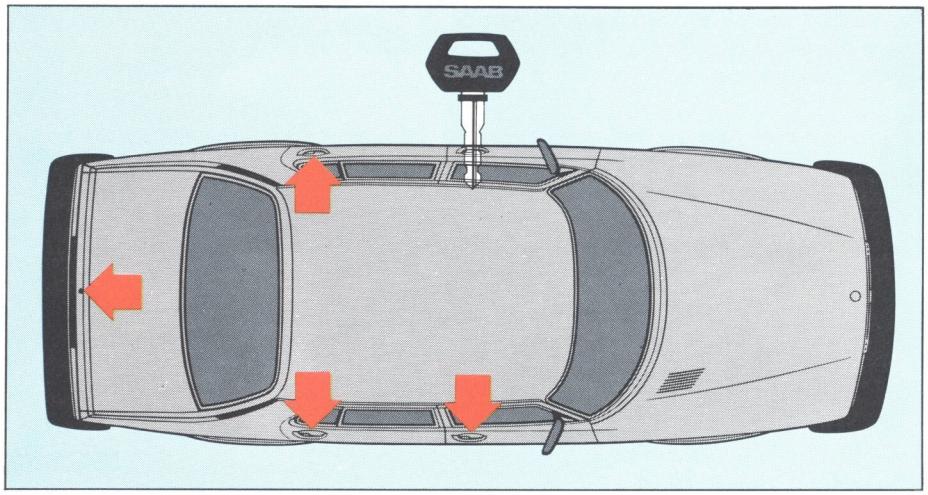
The center console is provided with a recess for coins, and another recess is located on the top of the driver's side of the instrument panel.

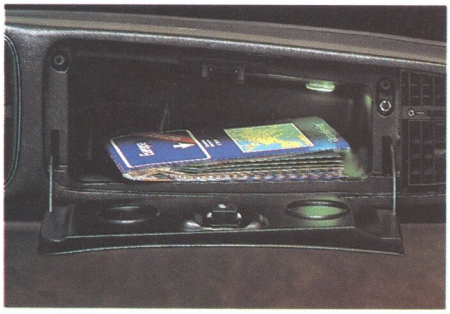
The front console on two-door 900S/16 valve and all Turbo models also has a compartment for small item storage.

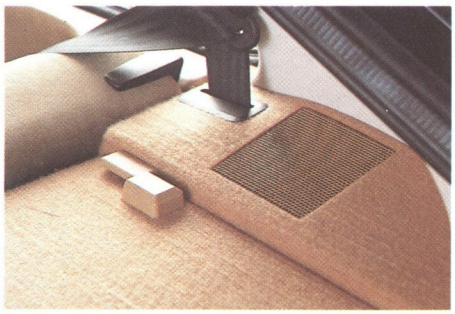
Extra space below the floor

A compartment under the luggage area floor accommodates the spare wheel, jack and tools. These items are clamped in position so that they will not rattle. There is also space in the compartment for storage of additional items.

Punctures are very uncommon today, and the spare wheel is therefore very seldom used. To save weight and space, Saab has chosen (as have most other car manufacturers) to equip its models with a lightweight compact spare. This tire is designed for temporary use during periods of time needed to repair or replace the original tire.







The Saab 900 model includes provision for simplified installation of a radio/cassette tape player. All wiring and front speakers are factory fitted as standard equipment. Provision is also made for simplified fitting of rear loudspeakers in the parcel shelf or the shelf supports.

The tools are stored in a special holder on the underside of the hatch-cover for the luggage area storage compartment.

Comfort: Practical features

"Practical design features have always been one of the Saab characteristics . . . a far cry from simple stereotypes."

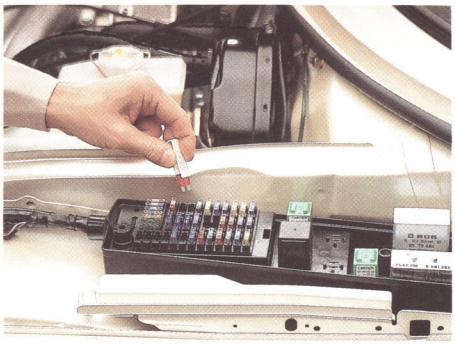
(MOT, GERMANY)

If need be, the compact spare wheel can be used to conclude a fairly long journey even with the car fully laden. However, care should be exercised not to drive continuously on this tire at speeds in excess of 50 mph.

Engine compartment

Since the hood opens forward and extends down to just above the wheel openings, the engine compartment is easily accessible for service and inspection. The risk of damaging the paintwork is also reduced. Another practical feature is that indirect lighting is provided in the engine compartment when the hood is raised and the headlamps are switched on.

The expansion tank for the coolant is transparent and the coolant level can therefore easily be checked. The dipsticks for checking the oil level in the engine and gearbox are easily accessible. This helps to keep hands and clothes clean when checking oil levels.



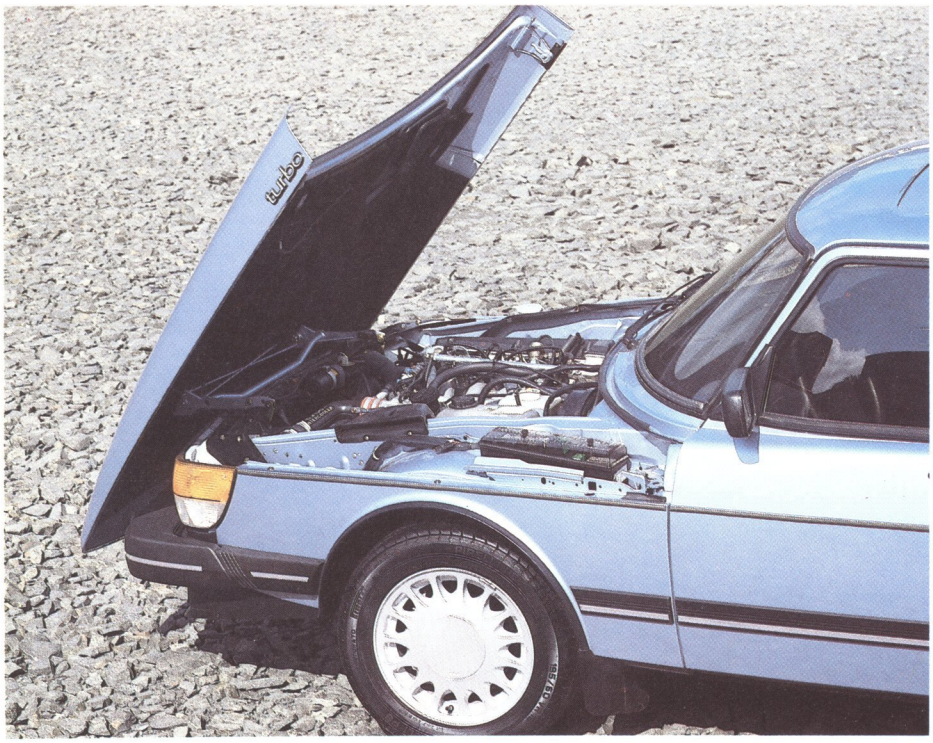
The electrical distribution box is designed to accommodate 10 relays and 31 fuses, plus 7 spare fuses in separate holders. The electric circuits are connected by means of a few multi-pole connectors. The circuits therefore can quickly and simply be opened when electrical work is to be carried out.

Exterior

The front bumper includes provision for fitting extra lights. This arrangement provides a firm mounting, without sharp, projecting brackets. Holes in the body, which may later give rise to rust, are therefore unnecessary.

Owing to the high engine torque throughout the speed range, the Saab 900 is very well suited for towing a trailer. All models include provision for simple fitting of a tow hitch. Tow lugs are provided at the front and rear as standard.

The fuel tank capacity of the Saab 900 is 16.6 gallons. The filler pipe has an internal collar which prevents splashing.



The engine compartment is easily accessible for service and inspection.

Accessories

"...situations may still arise in which the motorist may wish to boost the comfort or the utility of the car by adding certain accessories..."

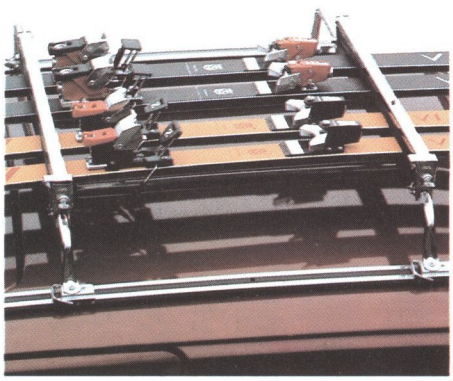
The 900 models are very well equipped but situations may still arise in which the motorist may wish to augment the comfort or utility of the car in its standard design, by adding certain accessories. This page shows a few of the accessories available from the Saab range.

Comfort and convenience equipment which can be fitted includes speed control, floor mats, and a leather padded sport steering wheel.

A range of audio systems, with components specifically developed for Saab, are also available. This range includes total systems for the 900 model, a graphic equalizer to upgrade the 900S sound system, and high performance speakers to upgrade all systems.

An equally impressive array of Saab engineered equipment is available for the exterior. Serial alloy wheels, fog lights, and rear window louvers accent the inherent sporty look of your Saab.

Trailer hitches and the Saab Thule roof rack system are available for those rare occasions you need to haul or carry something that won't fit into a Saab's roomy interior.



Fuel consumption

"The 2-litre Saab engine is incredibly flexible and economical..."

(MODERN MOTOR, AUSTRALIA)

In view of the fuel prices prevailing today, even a relatively minor reduction in the average fuel consumption of a car can represent substantial annual savings to the motorist. Even though the motorist himself can have a great effect on fuel consumption by driving more economically, some measures can also be adopted at the design stage.

For example, today's engineers do their utmost to painstakingly optimize the power units stage by stage. Engines are continually modified to suit the wide variety of fuels available today. Work is pursued on new design approaches, to modify entire vehicles so they require even less energy.

The Saab engine has long been regarded as one of the most economical engines in its class on the automotive market. Owing to its original modern design, Saab engineers have been able to develop and optimize the basic engine over the years to achieve the best possible balance between economy and performance. It has so far required no particularly extensive modifications to satisfy the pollution control standards in the US market.

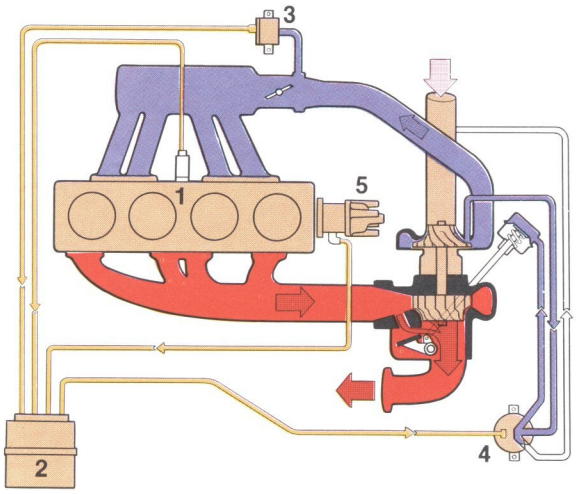
Because of the high torque, even at low speeds, gear-changing is reduced to a minimum, and fuel economy and performance are optimized.

The Saab 900 is equipped with an electrically driven radiator fan. A thermostat switches on the fan only when natural cooling is insufficient, such as in bumper-to-bumper traffic. This saves fuel as compared to a belt-driven fan, which is always running, regardless of whether or not the engine needs extra cooling.

The lower the engine speed...

The lower the engine speed at a certain road speed, the less fuel will be used. But if the engine speed is reduced by adjusting the overall gear ratio, the performance at the wheels will also be reduced. The car will have poorer acceleration, and many drivers spontaneously endeavor to compensate for this by means of the accelerator and the gear lever.

So if the overall gear ratio is adjusted too far towards optimum economy, many motorists may instead adopt driving habits which increase the fuel consumption. On the Saab 900, such factors have been taken into account in selecting the overall gear ratio.



The APC system developed by Saab enables the Turbo to run optimally on any grade of fuel. The car is thus more economical. The APC system also provides protection against dangerous knocking at unsuitable loads on the engine, or if the octane number of the fuel is too low.

The "brain" is the electronic unit (2). This receives signals from three sources: from the ignition distributor (5), from a knocking sensor in the engine block (1) and from a pressure sensor in the intake manifold (3). As soon as knocking occurs, the electronic unit will issue instructions to the turbocharger (across solenoid valve 4) to reduce the charging pressure.

The H engine

The most recent radical refinement to the basic Saab engine was undertaken with the 1981 model year. The "new" engine, code named the "H" engine, was almost 27 lbs lighter than the 1980 engine and even more economical on fuel.

All Saab engines are equipped with a breakerless transistor ignition system. In the breakerless system, the ideal values, once set, will remain undisturbed for a very long period of time. This is an economic benefit, since service requirements are reduced. But above all, the long-term fuel economy of the car will be improved as compared to a conventional system with breaker points.

The 16 valve engine

The application of a 16-valve engine to everyday motoring marks a new step in the development towards more efficient engines. Saab has chosen to take a somewhat different path to that taken by many other car manufacturers. Instead of applying the 16-valve technique only to achieve a higher engine output, Saab opted for a more moderate increase in engine power, coupled with reduced fuel consumption.

The APC system

Another ingenious feature is the APC (Automatic Performance Control) system. By 1982, Saab engine designers had developed a system which enabled the engine to be run on any grade fuel – from 87 to 93 octane – without impairing the smooth running of the engine or incurring the risk of damage due to knock.

A Turbo engine with APC adjusts itself automatically to the fuel used. The higher the octane number, the higher will be the engine output. But the vital benefit is that the APC system reduces the fuel consumption by about 8%, regardless of whether Regular or Premium unleaded gasoline is used.

This Saab innovation merited the 1982 Premier Award for Economy, an award made annually by the German periodical "Bild am Sonntag".

Weight

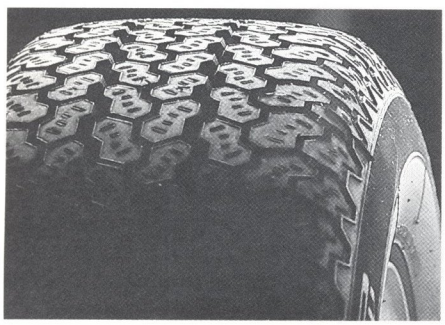
High collision safety and high comfort demand relatively large cars. But the weight-reducing design features are nevertheless numerous on the Saab 900. One of these is front-wheel drive, which eliminates the need for a drive shaft.

The cylinder head and the valve cover are made of light alloy. Aluminum wheels (on 900S and Turbo models), a compact spare wheel instead of the standard wheel and a fuel tank made of polyethylene instead of sheet steel are further weight-reducing features.

Rolling resistance

The Saab 900 and 900S three- and four-door models are equipped with low rolling-resistance tires. The rolling resistance of these tires is about 20% lower than that of conventional radial-ply tires. Saab was one of the first car manufacturers to introduce this innovation in 1980.

By using this new generation of tires the fuel consumption may be reduced as much as 6%, depending on the driving conditions and the tire with which comparison is made. The ride comfort and road behavior characteristics are of the same high class as those offered by other low-profile tires. The useful life is appreciably longer than that of conventional steel cord radial-ply tires. This is due to the lower internal friction.



Air resistance (drag)

The air resistance (drag) of a car has a major influence on the fuel consumption, and this influence increases with the speed of the car. If the speed is doubled, the drag will increase fourfold, if the speed is tripled, the drag will increase nine-fold, and so on.

The power necessary to overcome the air resistance increases even faster with increasing speed of the car. The power demand increases as a cubic function instead of quadratically ($2^3 = 8$, $3^3 = 27$, $4^3 = 64$, etc.). If the extra power necessary at the driven wheels is 0.7 hp at 20 mph, no less than 45 hp will be required at four times the speed at 80 mph ($0{,}7 \times 4^3 = 45$).

Head-on winds and cross-winds further increase the power demand and the fuel consumption. Tests have shown that an extra 2 gallons of fuel per every hundred miles are necessary when the car is being driven in a strong cross-wind.

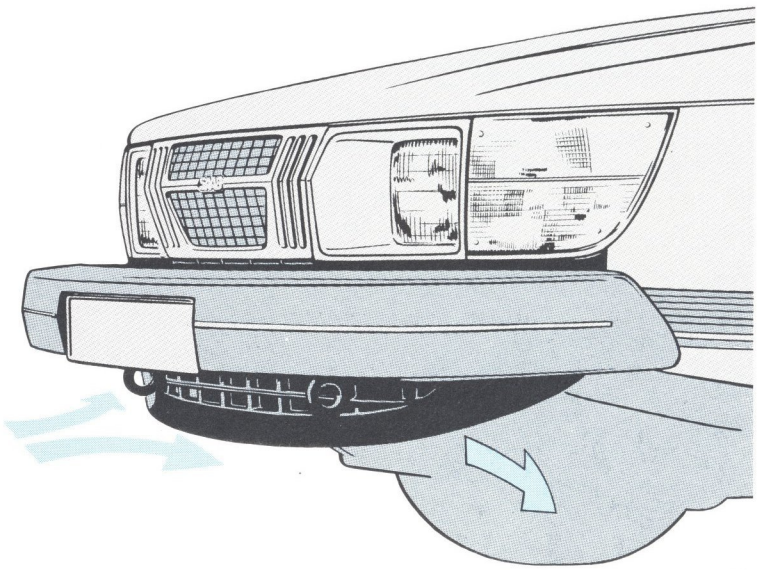
The drag coefficient (C_D) is used as a sort of quality factor for the form of a car body. The value of C_D is relatively independent of the size of the car and is between 0.30 and 0.50 on modern cars. The lower the coefficient, the more favorable is the shape.

Unfortunately, the drag coefficient often is used incorrectly for comparing the total air resistance of different cars. This is due to the fact that the cross-sectional area is of the same importance as the drag coefficient, and because the specified drag coefficient values are seldom directly comparable.

The drag coefficient is measured in a wind tunnel, and different wind tunnels produce different values on a given car. In addition, it must be known whether the coefficient applies to a "smooth model" or to a car with its standard cooling air intake, rear-view mirrors, mud flaps, exhaust system, etc. The difference may be as much as 25%.

The Saab 900 has a moderately large cross-sectional area as compared to other cars with corresponding interior space. However, the low, smooth front, with the gently rounded corners, the curved windshield and the smooth underside also contribute to the relatively low air resistance of the car. The air resistance is also low in a transverse direction, and is clearly demonstrated in blustery cross-winds.

All 900 models are equipped with front spoilers. The spoiler helps to reduce the fuel consumption. The 900S two-door and all Turbo models are fitted with a larger front spoiler. The Turbo three-door also has a rear spoiler as standard equipment.



Bumpers

"Only the Saab managed to conform to the American legal requirements – in spite of difficult test conditions..."

(AUTO MOTOR UND SPORT, WEST GERMANY)

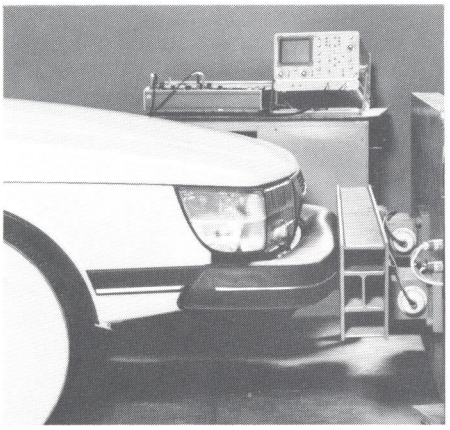
Saab was the first of the world's car manufacturers to produce a bumper capable of satisfying the strict U.S. demands which came into force at the beginning of the 1970s. New cars delivered to the U.S. market were to be equipped with bumpers designed to prevent damage to controls, headlamps, direction indicators, etc. in the event of a head-on impact into a barrier at a speed of 5 mph. At that time, a bumper satisfying these demands was already in series production at Saab.

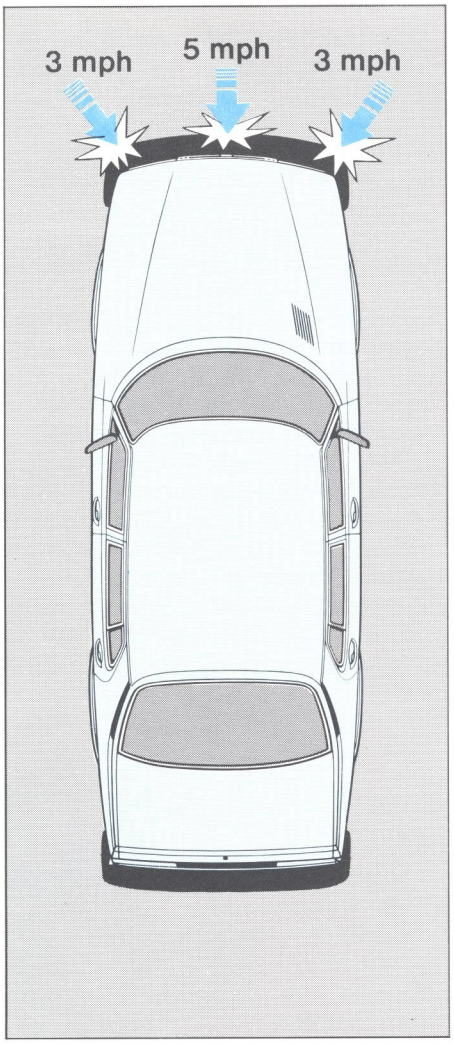
The latest U.S. regulations specify that front and rear bumpers must be capable of withstanding two pendulum blows at different heights as well as the head-on barrier test. One of the pendulum blows is applied in a longitudinal direction at a speed of 2.5 mph and the other at the corner at a speed of 1.5 mph.

In the case of the Saab 900, the front bumpers still meet the original 5 mph longitudinal test, and the corners can withstand an impact of 3 mph. In all cases, both front and rear bumpers must provide the body with full protection against damage. The Saab 900 can withstand these tests with ample margin.

Moreover, the Saab bumper is "self-repairing", i.e. it resumes its original shape and function after moderate impact. In the event of a heavier blow, it is usually sufficient to replace individual cellular blocks and the decorative strip on the outer casing. The complete job is simple and inexpensive.

In the sequence of pictures on the next page, a Saab 900 was driven straight into a post. The speed was 5 mph. The body sustained no damage whatever. The bumper was compressed at the point of impact, but resumed its original shape within a short space of time.





The actual time may vary from a few minutes to a few hours, depending on the extent of the deformation.

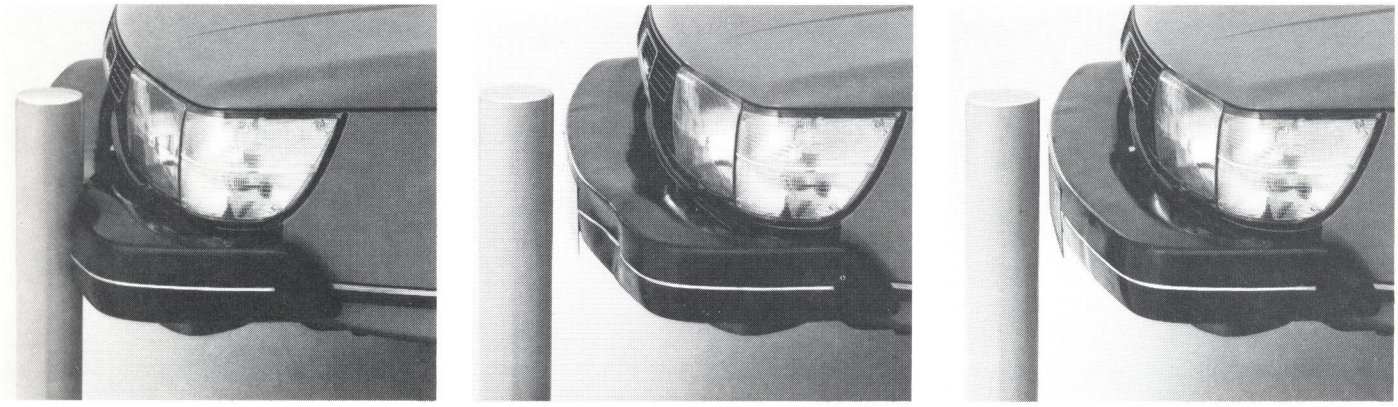
The design of the Saab bumper is patented. The assembly is backed by a sturdy but lightweight aluminum section. A number of energy-absorbing cellular plastic blocks are fitted to the outside of the section. A plastic rail on the outside of the cellular blocks is designed to distribute the pressure onto several blocks in the event of a collision. The assembly is enclosed by a casing of thermoplastic rubber. A plastic decorative strip is pressed onto the outside of the casing. The entire bumper is thus "rust-proof".

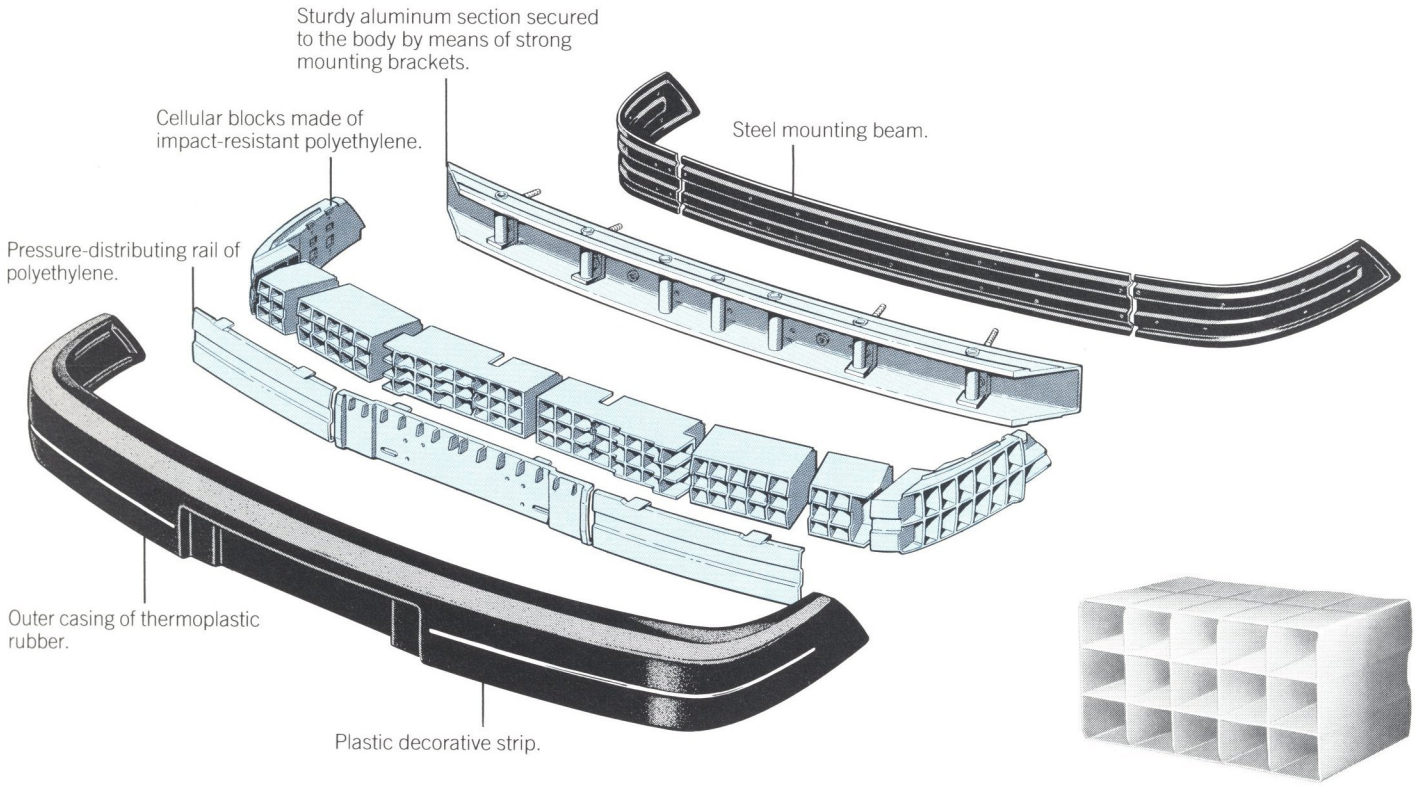
In view of its design and the sturdy mounting to the body, the Saab bumper can also withstand blows from the side. In this respect, it performs better than bumpers based on energy-absorbing dampers, which are liable to the risks of corrosion and binding.

The Saab 900 "dives" very little on braking. This, together with its ample height, enables the Saab bumper to provide effective protection for the body in the event of minor collisions in traffic jams, or when parking.

The front bumper includes a recess for the license plate, which therefore is provided with some protection.


SAAB
SAAB 900




Sturdy aluminum section secured to the body by means of strong mounting brackets.
Cellular blocks made of impact-resistant polyethylene.
Steel mounting beam.
Pressure-distributing rail of polyethylene.
Outer casing of thermoplastic rubber.
Plastic decorative strip.

Economy

Quality

"The attention paid to detail is excellent . . . The whole impression is of a car built to last . . ."

(AUTOCAR, GREAT BRITAIN)

The front assembly of the Saab 900 is an exceptionally sturdy design. Tests in a "Hydropulse" plant have demonstrated that the mountings of the wishbones, springs and shock absorbers are capable of withstanding demands which normally are made only on rally cars.

Over the years, Saab cars have been successful on competition tracks, particularly in demanding rallies, in which the durability and road behavior are put to gruelling tests. Competition has been an important element in the test activities at Saab.

Electrical system and components

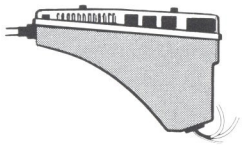
The electrical system of the Saab 900 is designed to satisfy the insulation standards applicable in high-voltage systems. The number of fuses is exceptionally large. A series of relays ensure that the correct voltage will be supplied to important functions, even after the car has been in service for a number of years.

The Saab 900 is equipped with a 1070 W alternator. The alternator

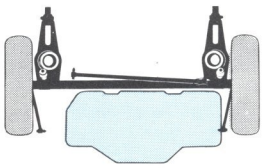
Aluminum is used for items such as the crossmember under the engine, and window mechanisms. Aluminum wheels are standard on certain models. The grill is made of tough plastic.

Many exterior parts are made of non-corrosive materials, including wiper arms, moldings and hub caps. The bumpers are made of aluminum, tough plastic and thermoplastic rubber.

The fuel tank is in a protected location, in a tunnel between the rear wheels. It is made of very sturdy and tough polyethylene plastic and is therefore "rust-proof".

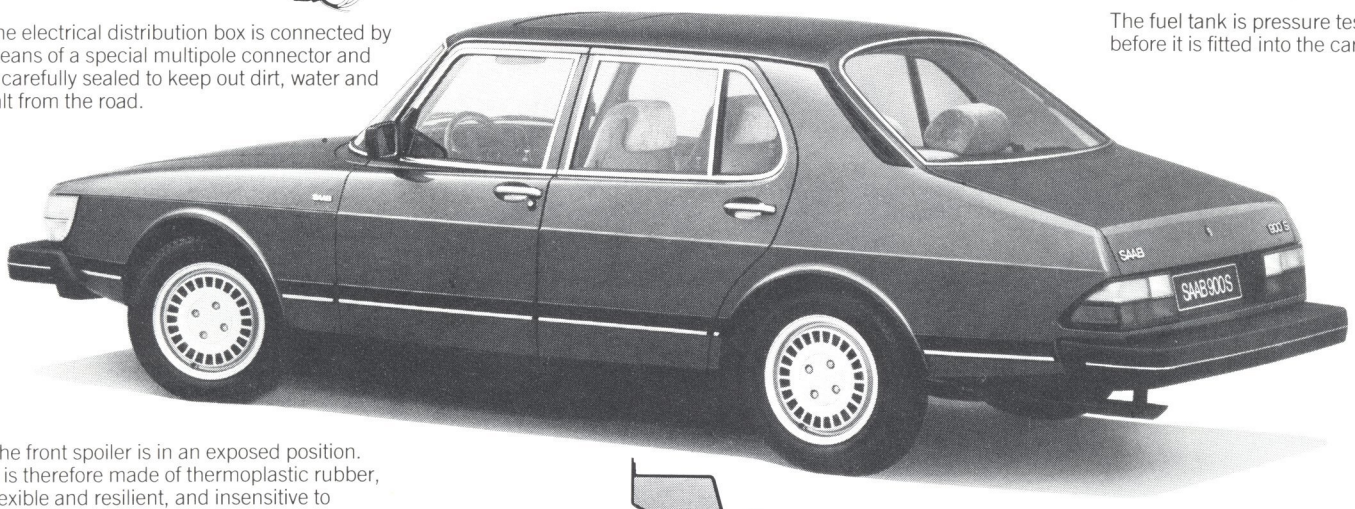


The rating of the starter motor is exceptionally high. The ignition switch design prevents engaging the starter motor when the engine is running.

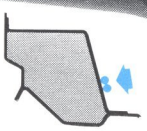


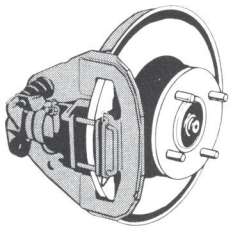
The fuel tank is pressure tested before it is fitted into the car.

The electrical distribution box is connected by means of a special multipole connector and is carefully sealed to keep out dirt, water and salt from the road.



The front spoiler is in an exposed position. It is therefore made of thermoplastic rubber, flexible and resilient, and insensitive to flying stone chips and low temperatures.





The foot brake as well as the hand-brake is self-adjusting. Semi-metallic pads are fitted at the front, where the wear is normally heaviest.

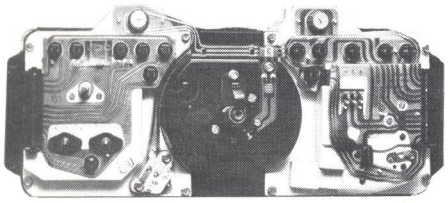
The front brake pads are common to the foot brake and handbrake. The hand-brake is mechanical. There is little risk of the handbrake binding, since it is actuated every time the foot brake is applied.

The brake lines are well protected. They are given anti-corrosion treatment and are run generally through a ventilated space inside the car.

The steering pin housing is secured with ball joints which are permanently lubricated, as are the wheel bearings. The entire front assembly is virtually maintenance-free.

The exhaust system runs through a tunnel, in which it is well protected against damage by rough roads. The ends of the muffler are made of exceptionally heavy gauge sheet, and are also aluminized. In addition, the ends have an expanding design. This reduces the temperature stresses in the welded joints.

charges the battery even when the engine runs at idling speed. The battery rating is 60 Ah, and the battery will accept a charge even when it is at very low temperature. These factors ensure reliable starting in the winter and a long useful life of the battery. Due to the high capacity of the electrical system, the lighting will be supplied at full voltage, even if many other electric power "consumers" are switched on simultaneously.



The fully-assembled instrument panel is subjected to functional testing before being fitted into the car. The instruments and lamps are connected by means of printed circuit boards.

The heating and ventilation system of the Saab 900 is vacuum controlled. The system is very reliable. No cables or linkages are used, and no stretching or binding can therefore occur.

The windshield washer pump is located in a recess in the washer liquid container, where it is protected from dirt which could cause malfunctioning.

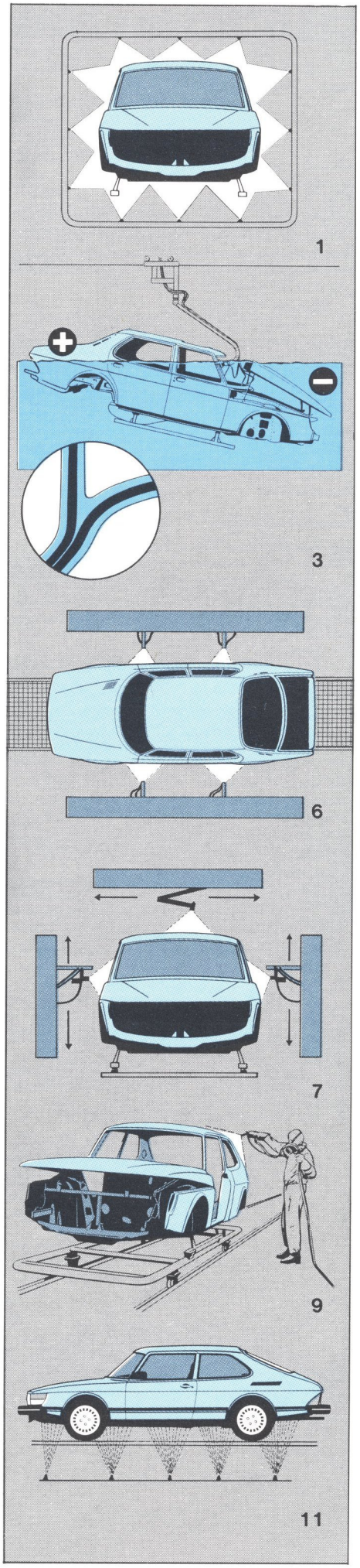
Corrosion protection

The Saab 900 is one of the cars best capable of withstanding corrosion attack. However, good protection against corrosion must always start at the drawing board stage.

The body is smooth and almost entirely devoid of sharp corners. The sill members are ventilated to the inside of the car. The doors are provided with drain holes. And the underside of the car has no particular "rust traps".

The front wheel housings are ventilated and are completely separate from the fenders and hood, and neither the wheel side nor the engine compartment side has cavities which can collect dirt and moisture.

These design and construction features have been pointed out as praiseworthy examples by the state-operated Swedish Motor Vehicle Inspection Company, the national vehicle-testing authority which probably has more experience and knowledge than anyone else in the world regarding corrosion in road vehicles.



The welded joints are located above the lowest point of every component – the point at which water may possibly collect.

The greater the number of spot welds, the sturdier the body. But their size, quality and location are even more important than their number. Saab employs exceptionally advanced electronic measuring equipment for checking the quality of welded joints.

Automatic welding machines and robots are used at many stations in production, to guarantee high and uniform quality.

The corrosion-resistant body is given surface treatment in several stages:

1. The body is cleaned in an alkaline bath, and then given a treatment of zinc phosphatizing. This provides a certain amount of basic protection and ensures better adhesion of the primer.
2. The outside of the body is sprayed with a modified epoxy paint which reduces the risk of corrosion spreading around any damaged areas of the paintwork.
3. The body is next dipped in a bath of anti-corrosion primer. A strong electric current causes the paint particles to adhere firmly to all internal sheet-metal surfaces. Long electrodes are inserted into the sill beams, to ensure that the paint will penetrate and adhere firmly, even in such inaccessible areas. The method produces a continuous coat of paint of uniform thickness – even in corners and on edges.
4. All joints are sealed with a PVC sealing compound.
5. The underbody and wheel housings are sprayed at high pressure with a polyurethane compound. This provides a homogeneous protective "skin", without blisters, which also reduces the risk of flaking. The polyurethane compound adheres very firmly. After curing in a furnace, it produces a tough and exceptionally abrasion-resistant surface.
6. The surfaces below the mid-line of the body are sprayed with a thin layer of polyester-based paint, which provides extra protection against flying stone chips.
7. Before the polyester paint has dried, the entire body is sprayed with an intermediate coat of paint (modified epoxy paint), which provides good protection against corrosion and a good base for the top coat.
8. The polyester paint, intermediate coat, and underbody compound are oven cured.
9. The intermediate coat is rubbed down wet. The top coat is then applied and cured in an oven. Two coats are applied for metallic finishes. The first coat is thin and has a high pigment content. The last coat is a thick layer of clear varnish which protects the pigment and produces a very high gloss.
10. An anti-corrosion agent is sprayed into all cavities and joints – in the sills, doors and brackets. The agent is sprayed into a total of 30-odd points on the body.
11. The underbody surfaces and wheel housings are sprayed with a thick anti-corrosion agent.
12. A special wax is applied to the components in the engine compartment as protection against moisture and corrosion.

Technical specification Saab 900
1985 models

Engine.	900 and 900 S	900 S 16 valve	900 TURBO 16 valve
Engine type / displacement	4-cyl. in-line / 121 cu in (1985 cc)	4-cyl. in-line / 121 cu in (1985 cc)	4-cyl. in-line / 121 cu in (1985 cc)
Cylinder bore / piston stroke	3.54 / 3.07 in (90 / 78 mm)	3.54 / 3.07 in (90 / 78 mm)	3.54 / 3.07 in (90 / 78 mm)
Compression ratio	9.2:1	10.2:1	9.0:1
Fuel system	Mechanical fuel injection Bosch CI	Electronic fuel injection Bosch LH-Jetronic	Electronic fuel injection Bosch LH-Jetronic, turbocharger, intercooler and APC system
Recommended octane No.	87 (pump rating)	87 (pump rating)	87 – 93 (pump rating)
Fuel tank capacity	16.6 US gallons (63 liters)	16.6 US gallons (63 liters)	16.6 US gallons (63 liters)
Horsepower SAE net	110 hp (81 kW) at 5250 rpm	125 hp (92 kW) at 5800 rpm	160 hp (118 kW) at 5500 rpm
Peak torque	119 lbf ft (161 Nm) at 3500 rpm	128 lbf ft (173 Nm) at 3000 rpm	188 lbf ft (255 Nm) at 3000 rpm
Ignition system	Breakerless electronic	Breakerless electronic, with knock sensor control	Breakerless electronic
Battery / max. alternator output	12 V, 60 Ah maintenance free / 1070 W, 14 V 80 A	12 V, 60 Ah maintenance free / 1070 W, 14 V 80 A	12 V, 60 Ah maintenance free / 1070 W, 14 V 80 A
Starter motor	1.4 kW	1.4 kW	1.4 kW
Valve system	Overhead camshaft	Double overhead camshafts, four valves per cylinder, hydraulic cam followers	Double overhead camshafts, four valves per cylinder, hydraulic cam followers
Cooling system	10.8 US quarts (10 liters) of coolant; electrical motor driven fan	10.8 US quarts (10 liters) of coolant; electrical motor driven fan	10.8 US quarts (10 liters) of coolant; electrical motor driven fan

Power transmission.			
Manual gearbox	5-speed	5-speed	5-speed
Automatic transmission	Borg-Warner, 3-stage	Borg-Warner, 3-stage	Borg-Warner, 3-stage

Wheels.			
Rims	900: Steel $5^1/_2$ J × 15 900 S: Light alloy $5^1/_2$ J × 15	Light alloy $5^1/_2$ J × 15	Light alloy $5^1/_2$ J × 15
Tires	185 / 65 TR 15 steel belt radial tires	195/60 HR 15 steel belt radial tires	195 / 60 HR 15 steel belt radial tires (195 / 60 VR 15 on the Turbo 16 S)
Spare wheel	Special design	Special design	Special design

Weights.			
Curb weight, approx	900: 2660–2730 lb (1201–1235 kg) 900 S: 2720–2810 lb (1231–1271 kg)	2760 – 2800 lb (1251–1271 kg)	2850–2950 lb (1291–1335 kg)
Gross vehicle weight rating	900: 3640–3710 lb (1650–1680 kg) 900 S: 3710–3790 lb (1680–1720 kg)	3710–3770 lb (1680–1710 kg)	3840–3920 lb (1740–1780 kg)

Engine

Longitudinally mounted, liquid-cooled, in-line engine, inclined at 45° and integrated with the clutch, gearbox and differential; the clutch faces forward. Cast iron engine block. Light alloy cylinder head. 5-bearing crankshaft and camshaft.
Cooling system of pressurized type. Cross-flow radiator and separate expansion tank. The thermostat opens at 190°F (180°F on Turbo). Electric motor driven cooling fan. Thermostatically controlled, 150 W motor. The Turbo engines are furthermore equipped with a separate thermostatically controlled engine oil cooler.

Power transmission

The gearbox with the final drive and differential is located below the engine and is integrated with the engine. The front wheels are driven. The outer drive-shaft universal joints are of the Rzeppa constant-velocity type and all universal joints are permanently lubricated.

5-speed manual gearbox

Single dry plate clutch with flexible hub, of Borg & Beck manufacture. The clutch is actuated by a hydraulic system. Primary drive by a triplex chain.

Overall ratios between engine and driven wheels:

– Bottom gear	12.99:1
– 2nd gear	7.34:1
– 3rd gear	4.93:1
– 4th gear	3.54:1
– 5th gear	2.86:1
– Reverse gear	14.28:1
Ratio of primary drive	0.78:1
Ratio of final drive	3.67:1

Theoretical road speed in top gear at 1000 r/min of the crankshaft:

– with 185/65 R15 tires	24.6 mph
– with 195/60 R15 tires	24.4 mph

Automatic transmission

The engine drives the automatic transmission through a hydraulic torque converter. The torque multiplication varies between 2.4:1 and 1:1. Primary drive by a triplex chain.

Overall ratios between engine and driven wheels:

	Injection engines	Turbo engines
– Bottom gear	8.54:1	8.11:1
– 2nd gear	5.15:1	4.91:1
– Top gear	3.57:1	3.39:1
– Reverse	7.47:1	7.09:1
Ratio of primary drive	0.97:1	0.93:1
Ratio of final drive	3.67:1	3.67:1

Theoretical road speed in top gear at 1000 r/min of the crankshaft:

Tire dimension	900 900S	900S 16 valve 900 Turbo 16 valve
– with 185/65 R15 tires	20,9 mph	–
– with 195/60 R15 tires	–	21,8 mph
Shifting-up speeds	Bottom – 2nd	2nd – Top
– Moderate throttle	approx. 12 mph	approx. 15 mph
– Kick-down	approx. 50 mph	approx. 80 mph
Shifting-down speeds	Top – 2nd	2nd – Bottom
– Kick-down	approx. 65 mph	approx. 30 mph

Wheel suspension, springing

Transverse wishbones at the front.
Coil springs and gas shock absorbers.
The front springs are pivot-mounted and are located between the upper wishbones and the top locating points in the wheel housings.
The front shock absorbers are actuated by the lower wishbones.
Lightweight, rigid rear axle guided by two forward-facing and two rearward-facing links and a Panhard rod.
The rear springs and shock absorbers are actuated by the forward-facing, low-level links.
Total spring travel

– at the front	7.1 in (180 mm)
– at the rear	6.7 in (170 mm)

Maximum strokes of the shock absorbers (as fitted)

– at the front	3.8 in (96 mm)
– at the rear	6.2 in (158 mm)

Steering

Rack-and-pinion steering gear. Jointed and telescopic steering column with cylindrical, corrugated sheet metal bellows. Impact-absorbing, perforated sheet metal cage below the steering wheel. 33.8 ft turning circle diameter between curbs. Nominal steering ratio 18.9:1. Steering wheel turns lock-to-lock 3.7.

Brakes

Dual-circuit hydraulic foot brake system with vacuum servo. The servo unit reduces the necessary pedal effort by an average of about 40%. The left-hand front wheel and the right-hand rear wheel are actuated by one brake circuit and the diagonally opposite pair of wheels by the other circuit.
Self-adjusting disc brakes all round.
The handbrake and foot brake actuate the same brake pads at the front.
The handbrake is mechanical and self-adjusting.
The outer front brake pads are of the semi-metallic type.

Brake disc diameters	
– front wheels	11 in (276 mm)
– rear wheels	10.6 in (267.5 mm)
Brake pad friction areas	
– front wheels	18.0 in^2 (116 cm^2)
– rear wheels	12.4 in^2 (80 cm^2)
Brakes servo diameter	9 in
Braking effort distribution	Approx. 80% at the front on heavy braking on dry roadways. Approx. 70% at the front on gentle braking or on a slippery surface.

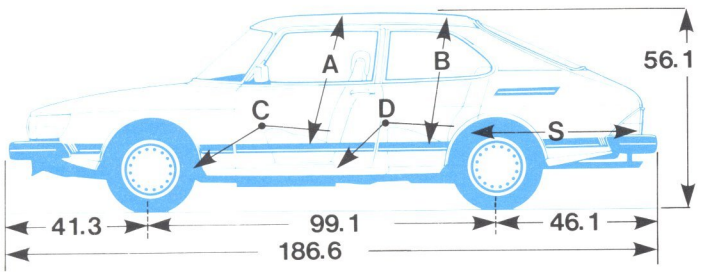
Luggage compartment volumes

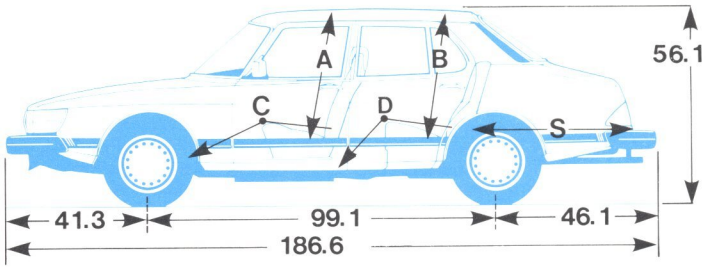
Ordinary luggage compartment 3-door models: 21.3 cu ft (602 liters), SAE 14.9 cu ft (421 liters). 2- and 4-door models: 21.8 cu ft (617 liters), SAE 14.2 cu ft (402 liters).
Luggage compartment with parcel shelf removed, 3-door models only, 27.2 cu ft (770 liters), SAE 19.1 cu ft (540 liters).
Luggage compartment volume, back seat folded down, 3-door models 56.5 cu ft (1600 liters), 2- and 4-door models 53 cu ft (1500 liters).

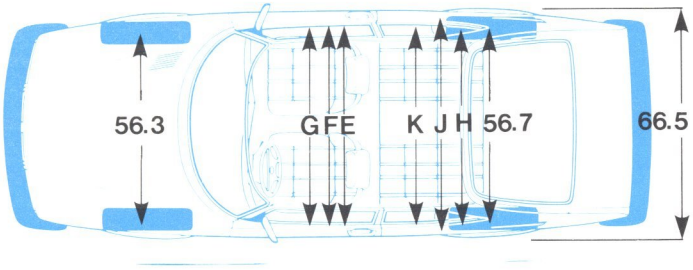
Loading capacity

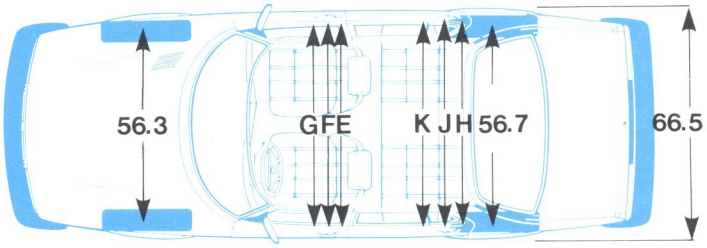
Weight distribution, percentage of curb weight resting on the front wheels ..... 57.7 – 60%
Recommended maximum weight of load in expanded luggage compartment ..... 480 lb (220 kg)
The total load-carrying capacity is always at least 950 lb (430 kg) which corresponds to 5 persons each weighing 150 lb + 175 lb (70 kg + 80 kg) of luggage. For every decrease in the number of passengers in the back seat by 1 person, the load can be increased by 65 lb (30 kg).
Highest permissible trailer weights

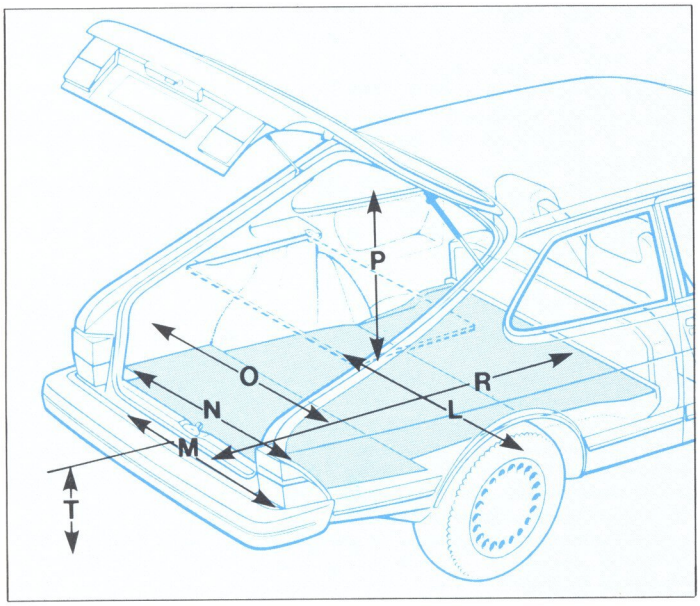
– with brakes	2000 lb (900 kg)
– without brakes	1000 lb (450 kg)
Maximum trailer tongue weight	200 lb (90 kg)
Maximum roof rack load	220 lb (100 kg)

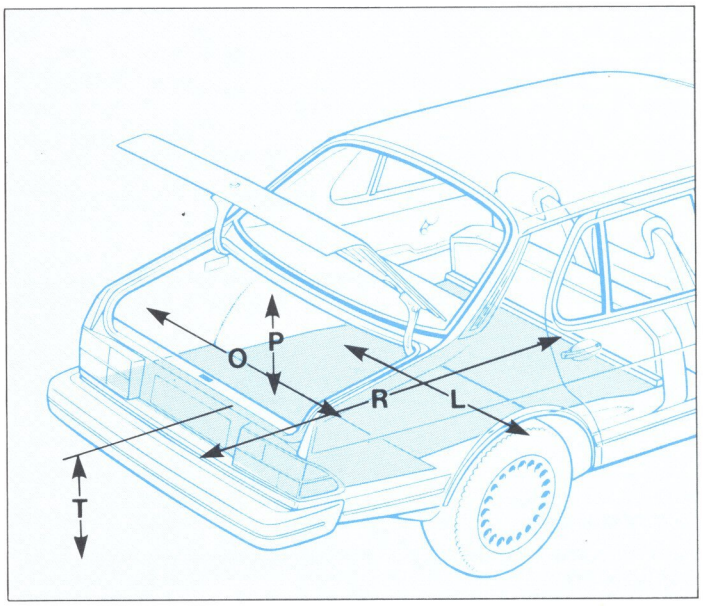












Inside dimensions (official SAE-measurements are given within brackets)		2-doors mm	2-doors in	3-doors mm	3-doors in	4-doors mm	4-doors in
A (H 61)	without sunroof	960	37.8	960	37.8	960	37.8
B (H 63)	for outer passenger	950	37.4	950	37.4	950	37.4
C (L 34)		1060	41.7	1060	41.7	1060	41.7
D (L 51)		915	36.0	915	36.0	915	36.0
E (W 3)	at shoulder height	1330	52.4	1330	52.4	1350	53.1
F	at elbow height	1370	53.9	1370	53.9	1400	55.1
G (W 5)	at hip height	1230	48.4	1230	48.4	1345	52.9
H (W 4)	at shoulder height	1355	53.3	1355	53.3	1345	52.9
J	at elbow height	1535	60.4	1535	60.4	1410	55.5
K (W 6)	at hip height	1300	51.2	1300	51.2	1350	53.1
L (W 201)	betw. wheel housings	1010	39.8	1010	39.8	1010	39.8
M (W 203)	at floor height	–	–	910	35.8	–	–
N (W 204)	at belt height	–	–	1060	41.7	–	–
O (W 205)	above belt height	1245	49.0	1045	41.1	1245	49.0
P (H 202)	opening height	450	17.7	800	31.5	450	17.7
R	with back seat folded	1755	69.1	1835	72.2	1755	69.1
S (L 203)	with raised back seat	1135	44.7	1210	47.6	1135	44.7
T (H 250)	lifting height	750	29.5	500	19.7	750	29.5

An important word about this brochure

We hope you find this brochure helpful, as we have tried to make it as comprehensive and factual as possible. However, since this brochure was printed, some of the information you see within may have been updated. Also, some of the equipment described in the brochure is available at extra cost.

Further, certain photographs and illustrations in the brochure are also common to editions published for other markets. Consequently, certain details shown in these photographs or illustrations may not be available in the U.S. market.

Finally, we reserve the right to make changes at any time, without prior notice, in prices, colors, materials, equipment, specifications and models, including the discontinuation of models. Check with your Saab dealer for complete and up-to-date information before ordering.

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