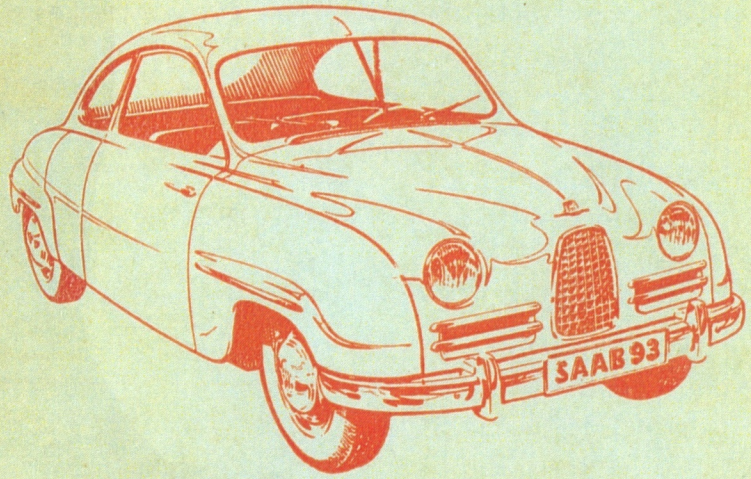
SAAB 93



SAAB

OPERATION MANUAL

Preface

Dear Saab Owner,

It is a great pleasure to present you with this manual for your Saab 93.

The Saab 93 is a high quality automobile, manufactured to fulfill the greatest demands regarding quality and performance. No car, however, how well it may be designed and manufactured, will give proper satisfaction unless it is correctly operated and serviced. Faulty driving technique and neglected service may impair the good qualities of the car and shorten its life. Particularly while the car is new, it needs regular inspection and service by trained experts. By reading this book and keeping it conveniently accessible, you will become familiar with your car and its qualities and you will also be able to ensure that it receives all the care it needs.

The first section of the manual, "Technical Data", provides a summary of the specifications of the car and its performances. The second part, "Description", will give you a general understanding of the construction of the car, its various systems and equipment. The third section, "Operating and Maintenance" — the most important part — includes instructions for running-in, general driving hints and directions regarding the care and maintenance of the car. Since some of the maintenance operations described are very important, it is recommended that they be carried out by an approved service garage, unless you are quite sure of getting a satisfactory result yourself. Convinced that the contents of this booklet through you will be of benefit for your car, we are sure your Saab 93 will give you the profit and pleasure that you expect from it.

SVENSKA AEROPLAN AKTIEBOLAGET

Trollhättan, Sweden

Introducing the SAAB AIRCRAFT COMPANY

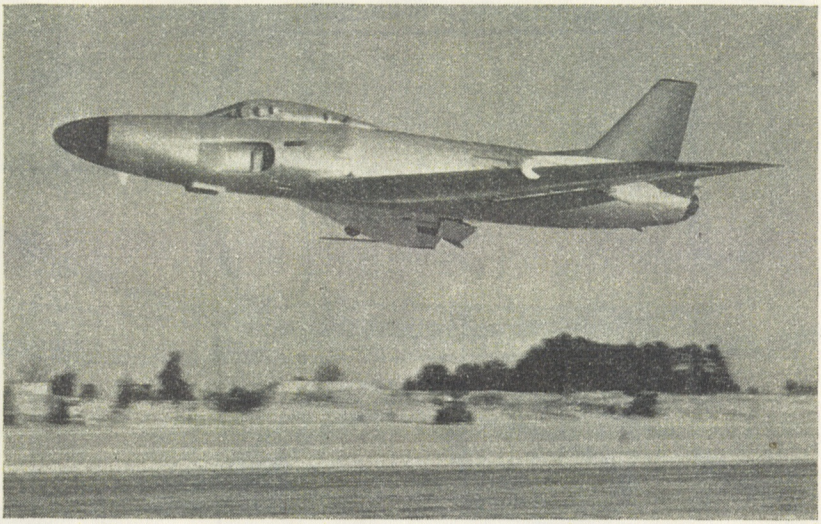
Although originally formed in 1937 to manufacture airplanes, the SAAB Aircraft Company has since World War II also become a major producer of automobiles.

SAAB began automobile production in 1949—50 with a four-passenger two-cylinder car — the Saab 92 — which rapidly gained popularity for its rugged design, excellent economy and outstanding driving characteristics. In 1955—56 the Saab 92 was replaced in production by a new model, the Saab 93. Differing from its predecessor in having a completely new and considerably more powerful three-cylinder engine as well as a new suspension and other important improvements, the Saab 93 has quickly become a real best-seller not only in the highly competitive Swedish market, but also in the export markets. Its outstanding qualities have been proved by overall victories in several international car rallies, including the 4th Annual Great American Mountain Rallye in 1956.

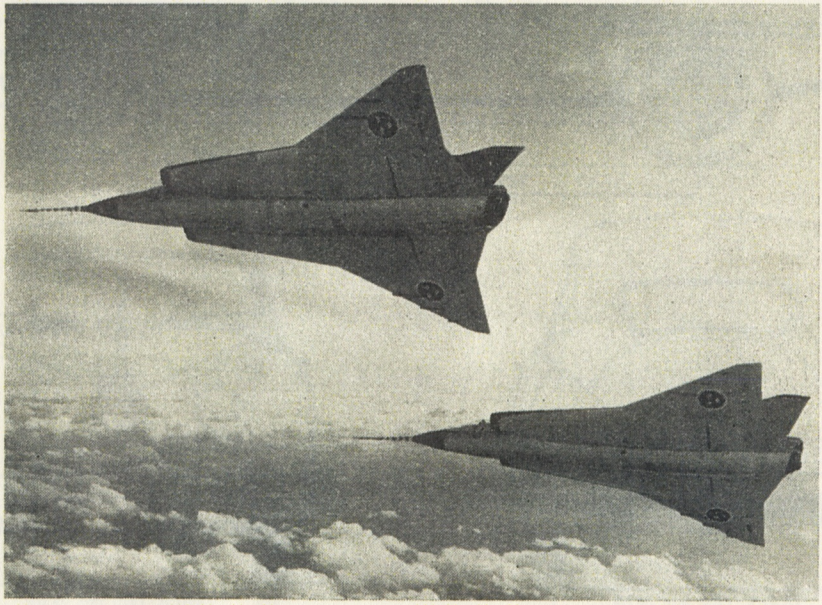
The SAAB Aircraft Company is today the largest privately-owned airplane manufacturer on the European continent, employing in its own factories nearly 8.000 people. It supplies most of the aircraft used by the Swedish Air Force, and is well known in international aviation circles for the modernity of its airplanes. In 1951, SAAB started delivering to the Swedish Air Force the Saab 29, the first swept-wing jet fighter in service in Western Europe. The Saab 29 is still the most used fighter airplane in Sweden. Currently in large-scale production is the Saab 32 "Lansen", a two-seat radar-equipped allweather attack, fighter and reconnaissance airplane, which can attain supersonic diving speed. The "Lansen" entered service with the Air Force late in 1955.

At about the same time another new SAAB airplane made its first flight, the spectacular Saab 35 "Draken", single-seat, allweather fighter. Featuring a special type of delta wing called the "double delta", developed exclusively in Sweden, the Saab 35 has a high supersonic top speed and a phenomenal rate of climb. This highly advanced fighter has now gone into quantity production for the Swedish Air Force.

Saab today operates four major factories in addition to a number of smaller plants. The main factory and the center of airplane development and production is at Linköping. The three other major plants are situated at Trollhättan (motorcars, airplane components and jet engine parts), Gothenburg (motorcar components etc.) and Jönköping (airplane equipment etc.).

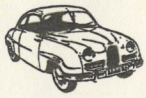


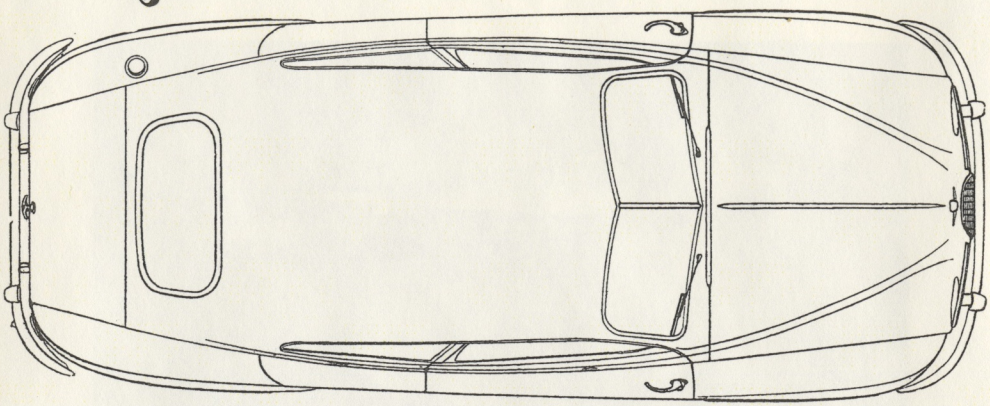
A Saab-32 "Lansen" taking off

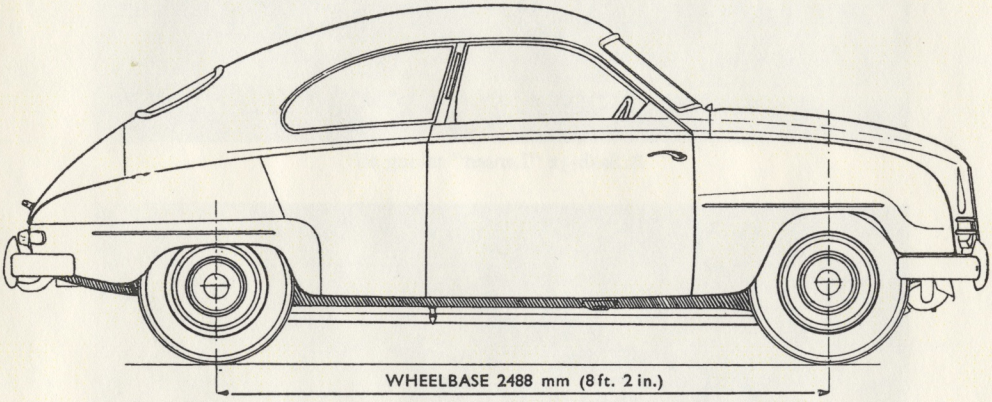


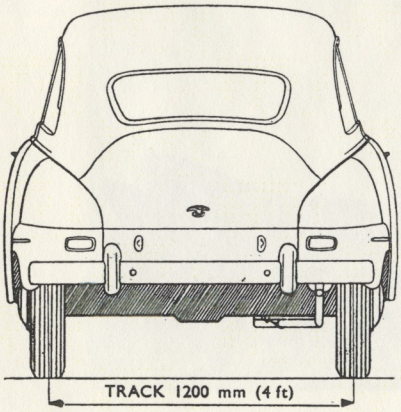
Two Saab-35s, "Draken". Supersonic jet fighters

SAAB









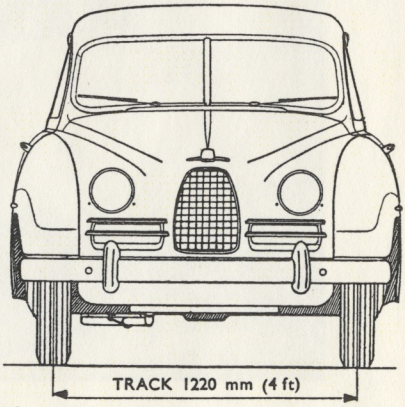


Fig. 1. Four-view drawing

SAAB 93

Technical Data

General

Overall length, including bumpers	approx. 4010 mm (13 ft. 2 in.)
Overall width	approx. 1570 mm (5 ft. 2 in.)
Overall height, empty	approx. 1470 mm (4 ft. 10 in.)
Road clearance (2 passengers)	approx. 190 mm (7.5 in.)
Track, front and rear	1220 mm (4 ft.)
Wheelbase	2488 mm (8 ft. 2 in.)
Turning radius	approx. 5.5 m (18 ft.)
Hill climbing performance	
1st speed	32 %
2nd speed	15 %
3rd speed	8 %
Reverse	40 %
Empty weight, excl. fuel and water	approx. 777 kg (1710 lbs.)
Empty weight, incl. fuel, water, tools and spare wheel	approx. 805 kg (1775 lbs.)
Weight distribution	
Empty	front 58 % rear 42 %
Fully loaded, incl. 4 passengers and 80 kg (176 lbs.) luggage = 1200 kg (2600 lbs.)	front 49 % rear 51 %

Engine

Type	three-cylinders in-line, two-stroke
Power	
SAE at 5000 rpm	38 hp
DIN at 4200 rpm	33 hp
Cylinder volume, total	748 cc (46 cu.in.)
Bore of cylinders	66 mm (2.59 in.)
Stroke	73 mm (2.87 in.)
Compression ratio, nominal	7.3

Correction:
pt should be qt

Lubrication

Engine	oil mixed-in fuel
Mixing ratio (oil/fuel)	1:25 (1 pt to 6—8 gals)
Oil quality	SAE 40 or equivalent

See also "Lubrication Directions" on page 61.

Fuel System

Fuel tank capacity	approx. 36 liters (9.5 US gal)
Carburetor, down-draft type	Solex, type 40 AI
Fuel pump, electric	SU, type L

Cooling System

Capacity, incl. heater	approx. 6.5 liters (1.7 US gal)
Temperature, normal	approx. 90° C (195° F)
Thermostat, opens at	approx. 85° C (185° F)

Transmission

Gear ratios, total	
1st speed	17.19:1
2nd speed	8.53:1
3rd speed	5.23:1
Reverse	21.01:1
Differential gear ratio, pinion/ring gear	5.43:1
Oil capacity, gearbox with differential	approx. 2 liters (2 US qts)
Clutch	single dry plate with cushioning device
Plate diameter, outer	180 mm (7 in.)
Road speed at 1000 rpm engine speed. Wheel radius 303 mm (12 in.)	
1st speed	6.6 km/h (4.1 mph)
2nd speed	13.4 km/h (8.4 mph)
3rd speed	21.8 km/h (13.6 mph)
Reverse	5.4 km/h (3.4 mph)

Suspension

Maximum spring movement:	
Front wheels	140 mm (5.5 in.)
Rear wheels	170 mm (6.7 in.)
Shock absorbers, type	hydraulic-telescopic
Maximum stroke, front wheels	85 mm (3.5 in.)
rear wheels	125 mm (5 in.)

Brakes

Foot brake, four-wheel	hydraulic
Manufacturer	Lockheed
Brake shoe linings, size	8″ × 1 1/2″
Total area	580 cm² (90 sq. in.)
Parking brake, rear wheels	mechanical

Steering Mechanism

Steering gear ratio, steering wheel/road wheels	average 14:1

Wheels and Tires

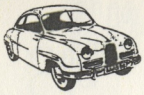
Type	wide base disc wheels
Rim dimension	4J × 15″
Tire:	
Type	tubeless
Dimension	5.00×15″
Tire pressures:	
Front	1.8 kg/cm² (26 lbs./sq.in.)
Rear (according to load)	1.4—1.7 kg/cm² (20—24 lbs./sq.in.)

Front Wheel Alignment

Toe-in, measured on rim	2 mm ± 1 (0.08 in ± 0.04)
Camber	3/4°
Caster	2°
"King pin" inclination	7°

Electrical System

Voltage	12 volts
Battery, capacity	33 amp.h
Starter	0.5 hp
Generator	160 watts
Spark plugs:	
Thread	M 18
Thread length	12 mm
Electrode gap	0.7 mm (0.028 in.)
Heat range:	
Long, fast driving — Cold plug	Bosch M 225 T1 Champion 5MJ
City driving — Hot plug	Bosch M 175 T1 or equivalent



Timing, advance weights retracted	8° before T.D.C.
Breaker point gap, distributor	0.3-0.4 mm (0.012-0.016 in.)
Automatic spark advance unit	centrifugal
Firing sequence (No. 1 is the rear cyl.)	1—2—3

BULBS, 12 volts	Philips No.	Watts
Domestic lighting		
Headlights, 2	12748	40/45
Parking lights, 2	12910	3
Lamps in direction indicators, 2 (39 mm) ..	12842	3
License plate lights, 2	12842	3
Stop and tail lights, 2	1034	23/7
Instrument light and control lights for turn indicators, headlights and fuel, 6	12829	2
Dome light	12844	5

FUSES	
25 mm (1 in.), 12	8 amp

Tools

Jack in bag
Tool bag, containing:
1 Spark plug/wheel bolt wrench (socket and pin), also used as crank for the jack
1 Adjustable wrench
2 Fixed wrenches
1 Combination pliers
1 Screwdriver
1 Square key for transmission filler plug, drain plug and inspection plug

SAAB 93

Description

General

The Saab 93 is a four-seater, two-door, front-wheel driven passenger car with an all-welded, self-supporting steel body. The aerodynamic design with a windshield of pronounced slope, a smooth floor and swept-down fenders minimizies the air resistance of the car.

The low air resistance and the relatively light weight of the car contribute to its high top speed, remarkable acceleration and low fuel consumption.

Serial and Engine Numbers

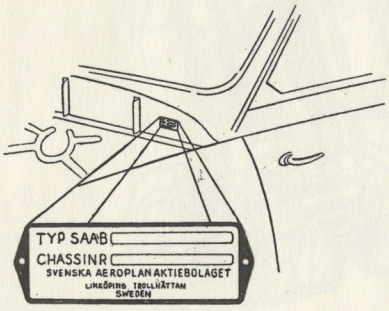


Fig. 2. Serial number

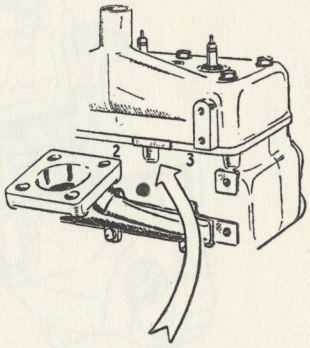


Fig. 3. Engine number

Engine

The engine is a three-cylinder, liquid-cooled, two-stroke engine employing the Schnürle-principle of charging through the crankcase. Lubrication is obtained by adding oil to the gasoline, in the ratio 1:25

(4 %) at time of fueling. The cylinder block and the upper part of the crankcase form a single unit which is machined together with the lower part of the crankcase. These two parts are iron castings while cylinder head and pistons are of aluminium alloy.

The crankshaft is supported in the crankcase by four single-row ball bearings, and the big-end bearings of the piston rods are double-row roller bearings. To eliminate torsional vibrations, the crankshaft is provided with a vibration damper at the front end.

Since the crankshaft is built-up of disks, interconnected by main and big-end bearing pins with very close tolerances requiring special precision machine tools, the crankshaft should be reconditioned only by the manufacturer.

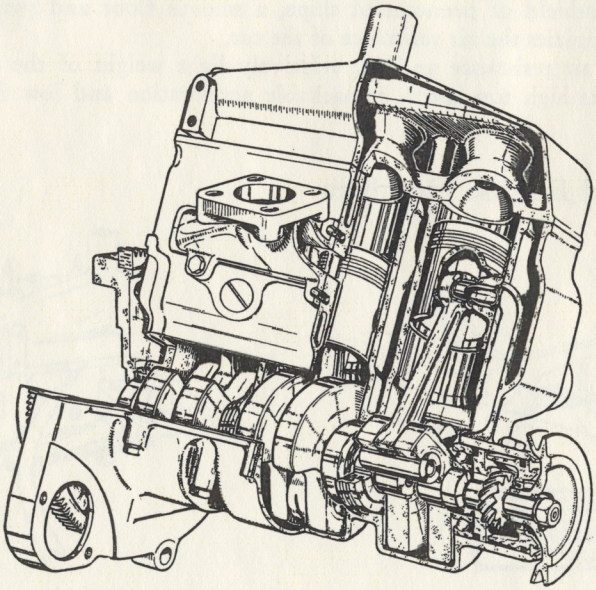


Fig. 4. Engine, sectioned

The engine and the transmission are bolted together and constitute the power unit, which is suspended on three rubber cushions.

The engine can be lifted out very easy either separate or together with the transmission.

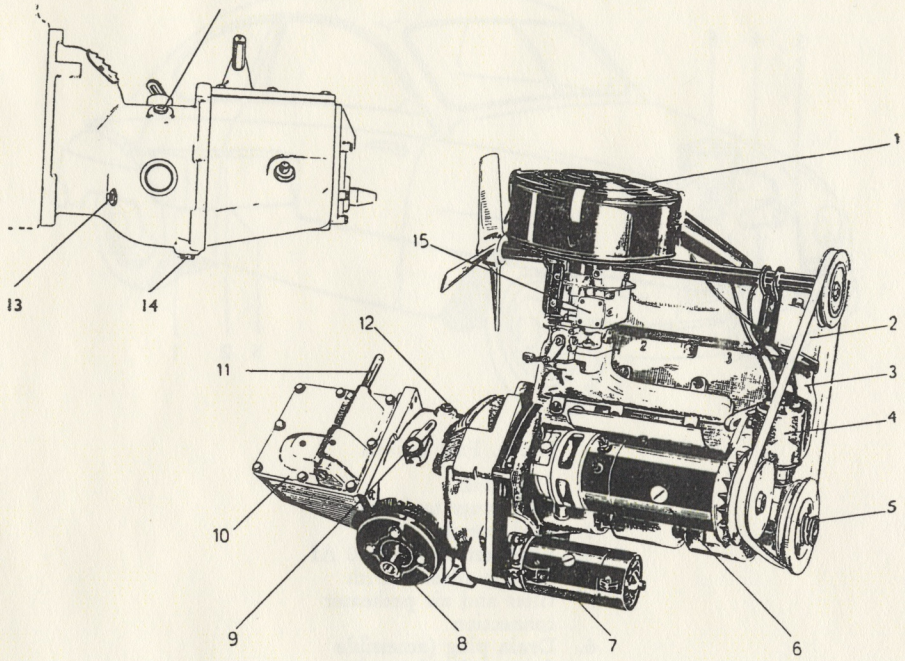
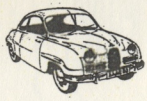


Fig. 5. Power Unit

1. Suction silencer with filter and air preheater connection
2. Cylinder head
3. Cylinder block with upper crankcase half
4. Distributor
5. Vibration damper
6. Generator and water pump
7. Starter
8. Drive shaft, inner universal joint
9. Free wheel control lever
10. Gearbox
11. Gear shifter
12. Filler plug
13. Inspection plug
14. Drain plug
15. Carburetor

Fuel System

The fuel tank is located at the rear under the floor of the luggage compartment and has a capacity of approx. 36 liters (9.5 U.S. gal). From the fuel tank a pipe runs to the electric fuel pump and from there a flexible pipe runs up to the carburetor. The system is provided with two filters, one inside the plug at the underside of the pump and the other one in the banjo connection at the carburetor.



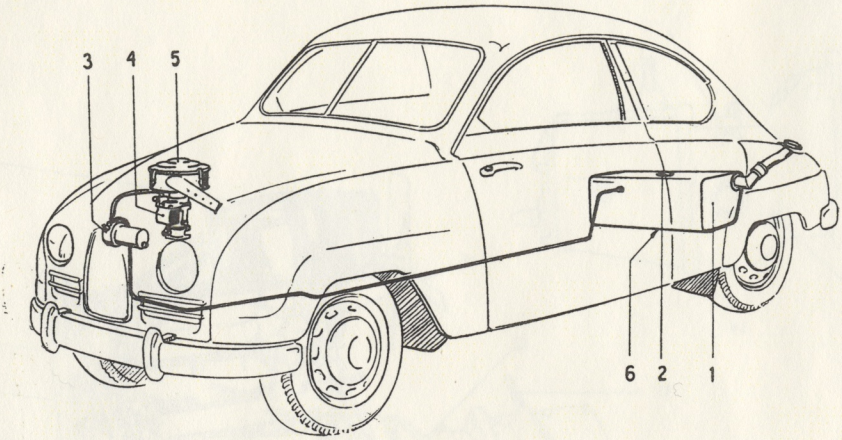


Fig. 6. Fuel System

1. Fuel tank
2. Fuel gauge tank unit
3. Fuel pump
4. Carburetor, Solex 40 AI
5. Suction silencer with filter and air preheater connection
6. Drain plug (accessible from under the car)

CARBURETOR

The carburetor is of the Solex down-draught type 40 AI. Adjustments of the various jets should only be carried out by skilled mechanics. The following figures give the nominal choke and jet sizes. The numbers refer to Fig. 7.

Air throat, 12	25 mm (1 in.)
Main system:	
Main jet, 1	130
Emulsion pipe, 4	1
Emulsion jet, 3	240
Cold start system:	
Fuel jet, 9	190
Air jet, 8	3.5

Idling system:
Fuel jet, 6 40
Air jet, 5 140

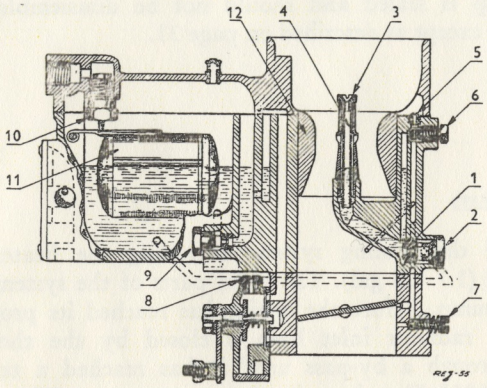


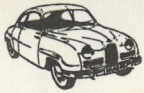
Fig. 7. Carburetor, Solex 40 AI

1. Main jet
2. Main jet carrier
3. Emulsion jet
4. Emulsion pipe
5. Idling air jet
6. Idling jet
7. Idling air adjustment screw
8. Starting air jet
9. Starting jet
10. Needle valve
11. Float
12. Air throat

The carburetor air is cleaned by a filter combined with the suction silencer which is fitted to the carburetor air intake. The silencer is secured to the carburetor by a clamp ring and supported to the fan shaft stand by a bracket. The carburetor air can be heated by connecting the filter suction pipe to the preheater, fitted around the exhaust manifold. See page 27 and fig. 15.

FUEL PUMP

The S.U. electromagnetic fuel pump is started by switching on the ignition, which causes current to flow through the magneto coil. The magneto attracts a membrane armature, whereby fuel is drawn in and a helical spring, located between the armature and the housing, compressed. A rocker in the breaker mechanism, connected to the armatur by means



of a spindle, flips over and breaks the circuit. Thus, the membrane with its armature, no longer being attracted by the magneto, is pushed back by the spring and the fuel is forced out. When the armature has returned fully, the rocker flips over again, thus closing the circuit and repeating the cycle.

The fuel pump is sealed and should not be disassembled during the warranty period, except as described on page 31.

Cooling System

The capacity of the cooling system, including the heater element, is approx. 6.5 liters (1.7 US gal). The main parts of the system are radiator thermostat and pump. Before the engine has reached its proper operating temperature, the radiator inlet hose is closed by the thermostat. The coolant flows through a by-pass until it has reached a temperature of approx. 85° C (185° F), when the thermostat opens. The fan is driven by a v-belt and generates a steady stream of air through the radiator core even at low road speeds. The pump is mounted on the rear end of the generator and is driven by the generator shaft extension.

Transmission

The transmission housing comprises a cast iron casing and an aluminum alloy casing bolted together to form a unit with three compartments. The rear compartment, the cast iron portion, contains shafts, gears, shift forks etc and constitutes the gearbox. The intermediate portion, that is the rear part of the aluminum casing, contains the free wheel and the ring gear with differential to which the drive shafts are connected. The front portion of the aluminum casing is bolted to the engine and covers the flywheel with clutch and release bearing.

As shown in fig. 8, the gearbox has three forward speeds and reverse. Spiral gears in constant mesh are used for the forward speeds and shifting is done by means of a coupling sleeve. A synchronizing device is provided between the 2nd and 3rd gears. The reverse gear is of the sliding type and serves also as a coupling sleeve for the 1st gear.

Between the gearbox and the clutch there is a free wheel which the driver can engage or disengage from inside the car by means of a control. The clutch is of the single dry plate type and the hub of the friction plate has six cushion springs, which serve as torque dampers.

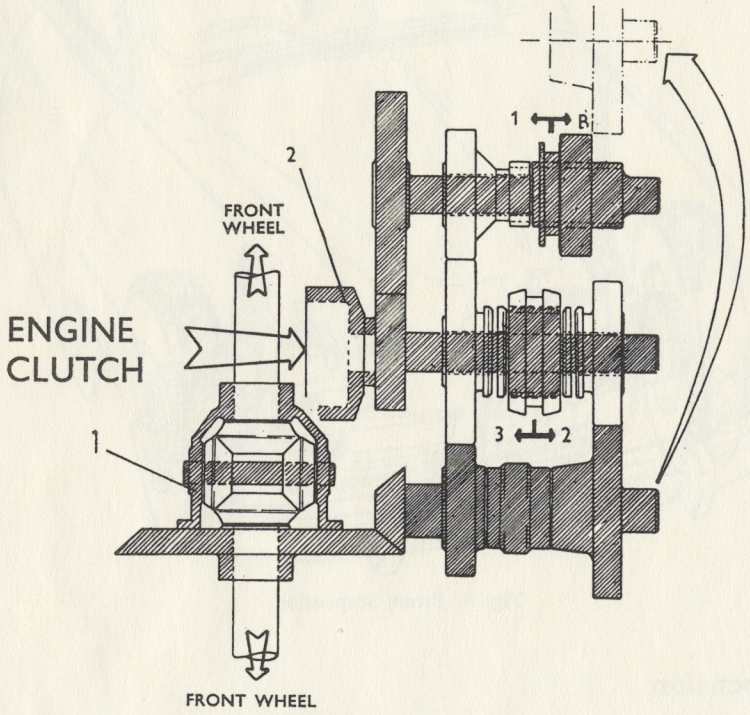
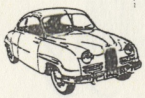


Fig. 8. Transmission (schematic)
1. Differential
2. Free wheel sleeve

Instructions for gearshifting and operating the free wheel will be found under "Driving Instructions", page 25.



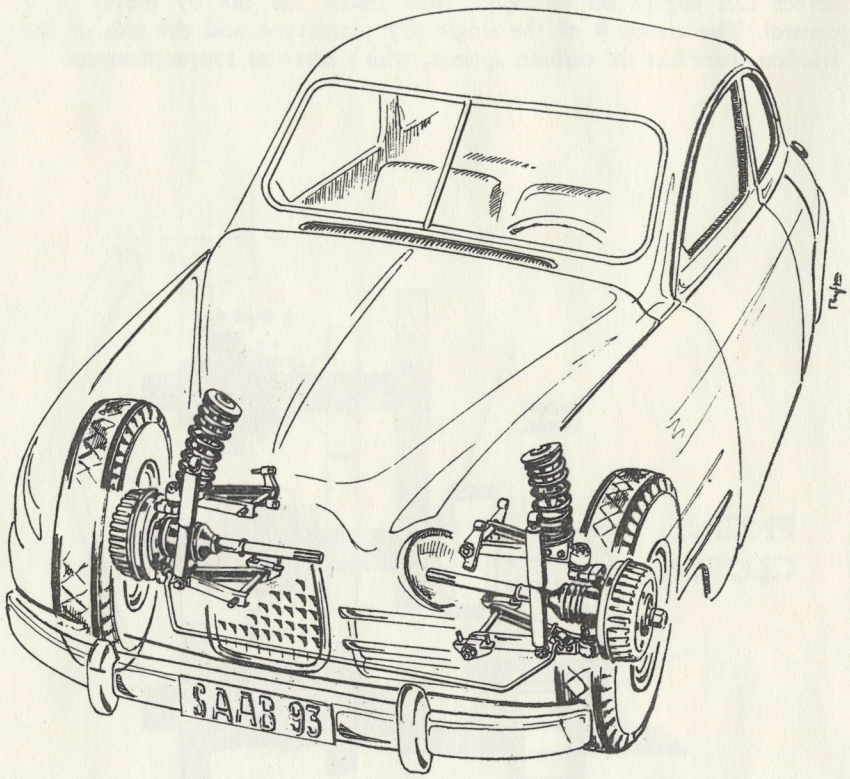


Fig. 9. Front Suspension

Suspension

The Saab 93 has coil spring suspension at the front as well as at the rear. Rubber bushings are used extensively to minimize road noise and reduce the numer of lubrication points.

The front wheels are independently suspended and each one is supported by a spindle housing, mounted in two transverse, V-shaped spring arms by means of ball joints. The spring arms are mounted to brackets secured to the body. Between a seat on the upper spring arm and a corresponding seat on the body, a coil spring is installed. A stabilizer, which is rubber mounted to the body at two points, acts on the two

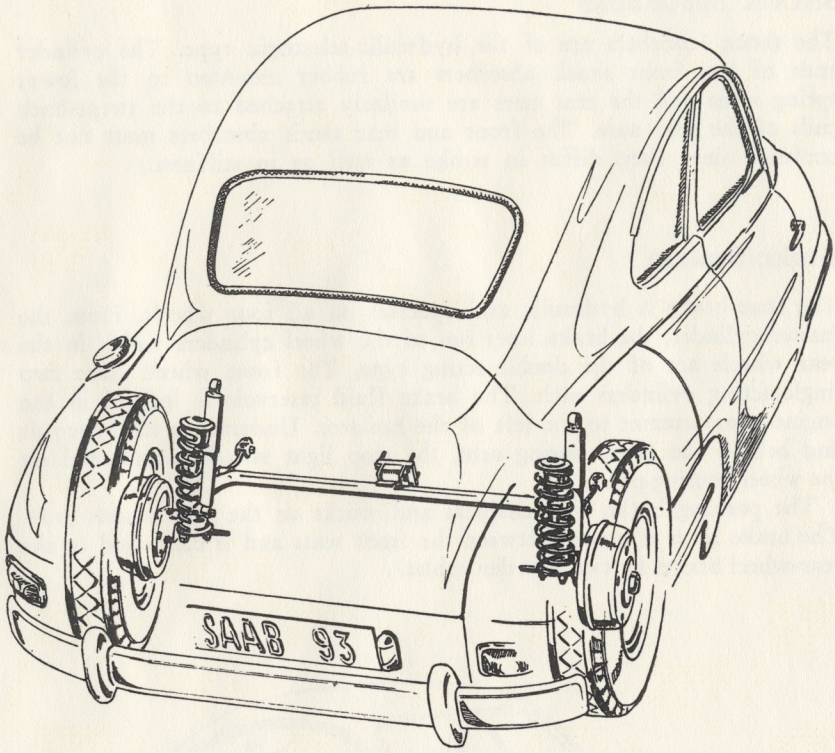
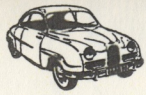


Fig. 10. Rear Suspension

lower spring arms. The movements of the spring arms are limited by rubber bumpers at top and bottom.

The two rear wheels are carried on spindles, projecting from the swept-back ends of the transverse, U-shaped rear axle which is placed in a tunnel under the body. At the middle, this axle is rubber mounted to the body, and it is braced longitudianally to the body by rubber mounted side links. The coil springs, one on each side, are installed between two seats, one on the body and the other one on the extension of the wheel spindle. The movement of the axle is limited upwards and downwards by rubber bumpers and band stoppers respectively.



SHOCK ABSORBERS

The shock absorbers are of the hydraulic-telescopic type. The cylinder ends of the front shock absorbers are rubber mounted to the lower spring arms and the rear ones are similarly attached to the swept-back ends of the rear axle. The front and rear shock absorbers must not be confused since they differ in stroke as well as in stiffness.

Brake System

The foot brake is hydraulic and operates on all four wheels. From the master cylinder, the brake lines run to the wheel cylinders which in the rear wheels are of the double-acting type. The front wheels have two single-acting cylinders each. The brake fluid reservoir is located in the engine compartemnt to the left of the radiator. Underneath the reservoir and behind the lower spring arm, the stop light switch is mounted on the wheel housing panel.

The parking brake is mechanical and works on the rear wheels only. The brake lever is placed between the front seats and is connected to the rear-wheel brakes by two Bowden cables.

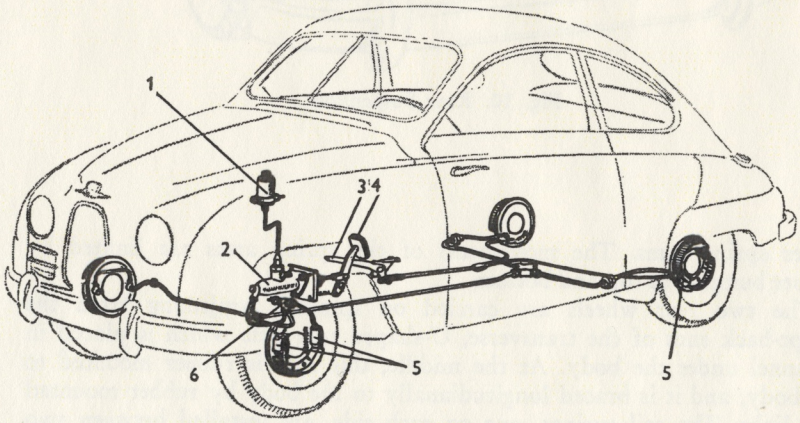


Fig. 11. Brake System

1. Brake fluid reservoir
2. Master cylinder
3. Brake lever
4. Brake pedal
5. Wheel cylinders
6. Stop light switch

Steering Mechanism

The steering movement is transmitted from a pinion at the end of the steering tube to a transverse rack, the ends of which are connected to the steering arms by adjustable drag rods of equal length. The drag rods are mounted to the ends of the rack and to the steering arms by means of ball joints, the inner joints being adjustable.

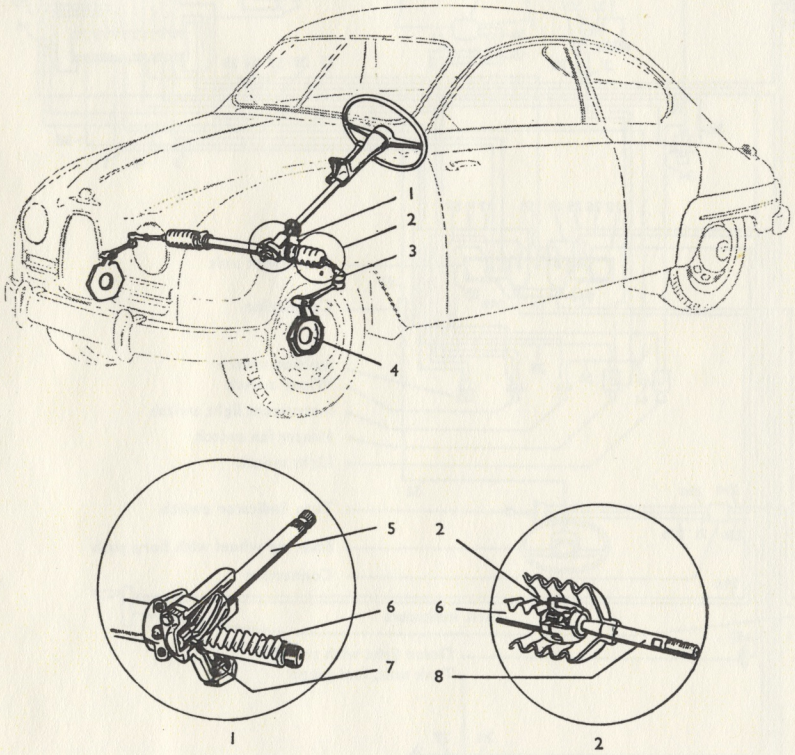


Fig. 12. Steering Mechanism

1. Steering gear
2. Inner ball joint
3. Outer ball joint
4. Spindle housing
5. Steering tube pinion
6. Rack
7. Rack damper, spring and plunger
8. Drag rod

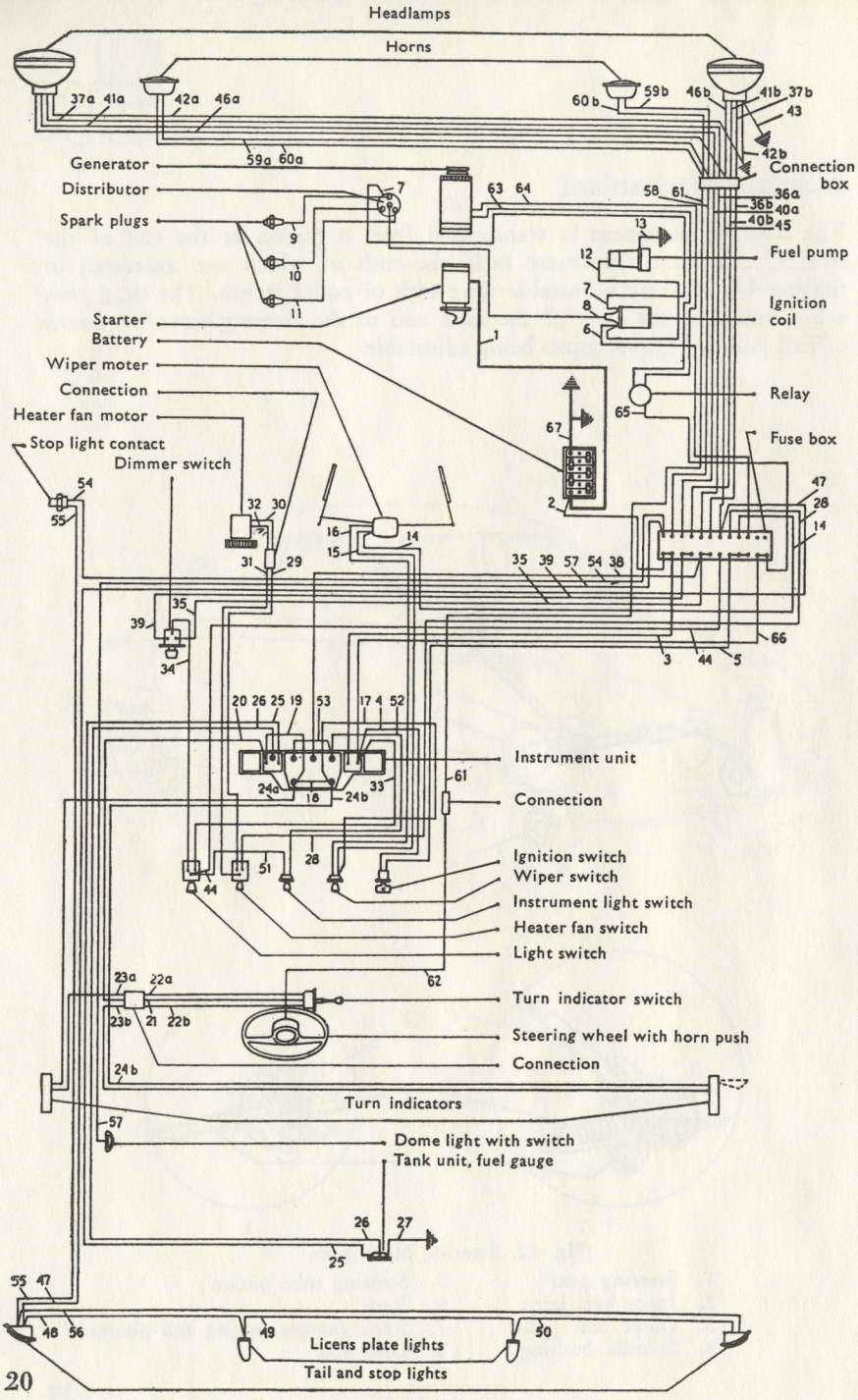


Fig. 13. Wiring Diagram

Wheels and Tires

The Saab 93 is equipped with tubeless tires. This substantially facilitates handling and repair and improves safety, since the probability of a tire blowout is virtually eliminated. In addition, the tubeless tire holds air far better than the conventional type with a separate tube. This remarkable tightness has been attained by employing a layer of special synthetic rubber compound on the inside of the tire and a number of concentric grooves on the outside seal against the inside of the wheel rim. Since the wheel rim proper forms part of the air chamber it must be tight and so must the valve and its connection to the rim.

Electrical System

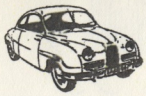
The electrical system its schematically shown in adjacent wiring diagram. To facilitate service and maintenance, the various cables have different insulation colours in accordance with the table below.

Insulation colours	Wire numbers in Fig. 13 Wiring Diagram
Blue	36a 37a 40a 41a
Grey	4 6 12 16 25 31 32 33 65 66
Green	24a 24b 44 45 46a 46b 47 48 49 50 51 52 53
Yellow	26 39 40b 41b 64
Red	2 3 5 8 9 10 11 14 15 17 18 19 20 21 29 30 34 54 55 56 57 58 59a 59b 63
Black	1 7 13 22a 23a 27 28 42a 42b 43 60a 60b 61 62
White	22b 23b 35 36b 37b 38

Instruments, Controls and Equipment

The instruments are placed in a panel in front of the driver and are easily visible through the duo-spoked steering wheel.

1. Speedometer and mileage recorder with control lights. The speedometer, graduated from 0 to 140 km/h (90 mph), is actuated via a flexible shaft by a worm gear on the pinion shaft of the gearbox.



meter and the first figure from the right registers each kilometer (mile). Control lamps for turn indicator. The left or right lamp lights up when the corresponding turn indicator is extended.
Headlight control lamp. The lamp is located below "70 km/h" ("45 mph") on the speedometer and lights up when the main beam is on.

2. The ammeter indicates the charging or discharging current of the battery.
3. Clock.
4. The fuel gauge indicates the fuel level in the tank when the ignition is switched on. A warning light comes on when about 7 liters (2 U.S. gal) of fuel is left.
5. The thermometer indicates the coolant temperature in °C (°F). Under normal driving conditions the temperature should be about 90°C (195 °F).
6. Lighting switch. On pulling out the knob to the first position, the parking lamps will be lighted. In the second position the headlights come on instead of the front parking lights.
7. Fan motor switch, see page 58.
8. Panel light switch, when the lighting switch 6 is pulled out.
9. Horn button.
10. Switch for optional electric equipment.
11. Windshield wiper switch.
12. Turn indicator switch.
13. Cold start control. For operation see "Cold start device" on page 26. The accelerator should not be depressed when the control knob is pulled out, since the effect of the cold start device is then reduced.
14. Hood lock lever.
15. Ignition switch.
16. Ashtray. A second one is provided for the back seat.
17. Starter control.
18. Ventilator lever, located behind the panel. The cowl ventilator opens when lever is pulled back.
19. Sun visors.
20. Windshield wipers.
21. Defroster slots for windshield.
22. Defroster holes for door windows.
23. Glove compartment.
24. Gear shift lever.
25. Free wheel control. The free wheel is locked by pulling the handle all the way out. See page 25.
26. Accelerator.

27. Brake lever.
28. Brake pedal.
29. Clutch pedal.
30. Dimmer switch, headlight main and low beam.
31. Seat adjusting mechanism. When the lever is depressed, the seats are unlocked for adjustment.
32. Grille screen control.
33. Air control. See page 58.
34. Air temperature and defroster controls. See page 58.

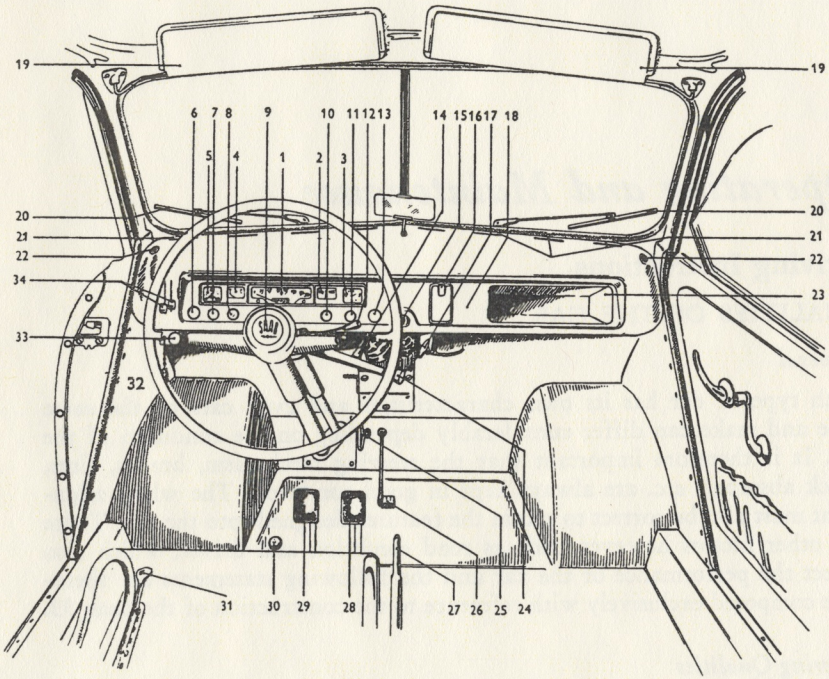


Fig. 14. Instruments and Controls

SAAB 93

Operating and Maintenance

Driving Instructions

QUALITIES OF THE CAR

General

Each type of car has its own characteristics and even cars of the same type and make can differ considerably depending on the condition of the car. It is therefore important that the steering mechanism, brakes, tires, shock absorbers etc. are always kept in good condition. The wheel alignment must also be correct to retain the features designed into the car. There are other factors however, such as road condition and driver, which also affect the performance of the car and the following statements are therefore composed exclusively with reference to the construction of the Saab 93.

Steering Qualities

Saab 93 is under-steered, which means that when driving in a curve with constant radius the car tends to straighten out its path as the road speed increases. The car is designed with this feature which tends to eliminate tail skidding and generally provides directional stability. If, however, owing to a violent maneuvre a tail skid should occur, this is easily checked because of the under-steering. This under-steering is partly due to a proper weight distribution which, with two people in front, is 58 % on the front wheels and 42 % on the rear ones. The weight distribution

is also one of the reasons why the Saab 93 is front wheel driven, as this gives the maximum traction and thus better possibilities of advancing on poor roads and when climbing steep grades. Another reason for the front wheel drive is that the car will maintain its direcitonal stability on slippery roads even if the pedals are used carelessly. A car with rear wheel drive would, under the same conditions, tend to skid around.

Free Wheel

As will be seen in fig. 8 on page 15, the gearbox has a free wheel device between clutch and main shaft. This device can be engaged or disengaged by means of a control, located above the brake pedal. With this control pushed in, the free wheel is engaged and when the control is pulled out, the free wheel is disengaged or locked.

The easiest way of locking the free wheel is to stop the car and then pull the control all the way out. To engage the free wheel, the control should be pushed in entirely.

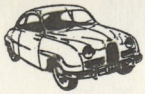
In general, the free wheel should be engaged which enables the car to coast for some time with the engine idling. This gives more miles per gallon of fuel and reduces engine wear. Gearshifting is also facilitated and a smoother and more even driving will be attained. Take advantage of the free wheel, not only downhill, but also on level roads. The only occasions when the free wheel should be locked are when the car is required for starting the engine, for example by towing, and when descending steep grades, in order to use the engine for retarding the car. This will protect the wheel brakes from excessive wear. Further instructions will be found under "Brakes".

Gearshifting

As shown in fig. 8, the gearbox is provided with synchro-mesh for 2nd and 3rd speeds. This means that the spur pinions of the second and third gears cannot engage with the shaft before the speed of the gear is the same as that of the shaft. The first gear is engaged to its shaft by means of a toothed coupling, integral with the reverse pinion.

The synchronizer and the toothed couplings make gearshifting very simple. Downshifts can be done without using the clutch, providing the free wheel is engaged. All gearshifts, however, should be carried out with easy and firm movements and with a slight, scarcely noticeable stop in the neutral position.

When shifting, the clutch pedal should be released smoothly and carefully. Make it habit always to remove your foot from the clutch pedal when not in use. To drive with slipping clutch or with your foot resting



on the pedal is bad practice since this will soon wear down the realease bearing and the clutch facings. At standstill, the gear shift lever should be put in neutral and the cutch pedal released.

Brakes

The car is delivered with a thoroughly tested type of brake linings with very good heat resistant qualities, which will stand high temperatures without their proper function being impaired. Be certain, therefore, that original Saab linings, or linings recommended by SAAB are fitted when relining the brakes.

There is a limit, however, to the temperature that any brakes can stand. When driving downhill on alpine roads, with considerable altitude differences, the free wheel should be locked in order to utilize the engine for braking. In top gear the retarding effect is rather small and the second gear should therefore be engaged, or for extremely steep grades, the first gear. The speed should under these circumstances not exceed 60 km/h (40 mph) in second gear and 30 km/h (20 mph) in first gear.

Cold Start Device

For easy starting at low temperatures, the carburetor is provided with a cold start device, the control of which is placed to the right on the instrument panel. By pulling out the control knob, a special jet combination in the carburetor functions and the engine receives a richer fuel-air mixture than normally.

The cold start control has one intermediate and one outer position. When starting a cold engine, the knob should be pulled out to the intermediate position, or under very cold conditions, to the outer position. While warming up the engine, the knob may be left in the intermediate position, but should be pushed in completely as soon as engine can operate on normal mixture.

Preheater

The engine is provided with a device for heating the carburetor air to prevent icing in the carburetor. Icing may occur if the relative humidity is more than 55 % and the temperature between —5 and +15°C (20 — 60° F), and causes excessive fuel consumption and decreased engine power. It is therefore recommended that the preheater always be connected except during the warm season. When the preheater is not being used, the connection pipe should be secured to the bracket on the front of the radiator frame, and the lower clamps fastened to the end of the pipe as shown in fig. 15:1.

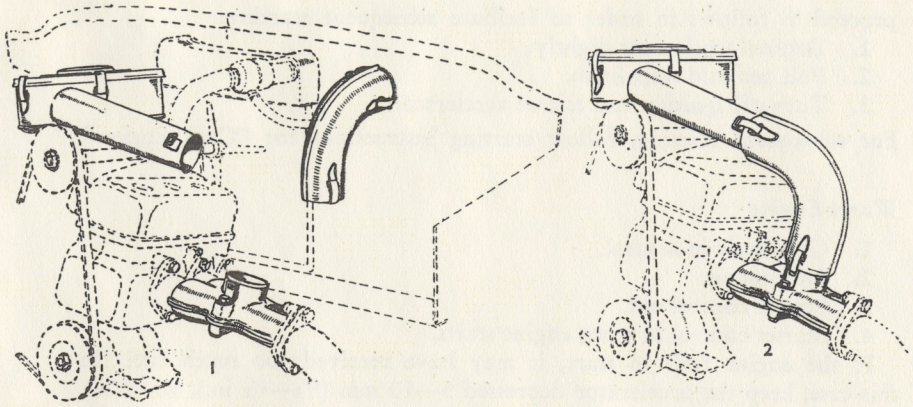


Fig. 15. Preheater
1. Cold (summer driving)
2. Warm (winter driving)

STARTING THE ENGINE

Cold Engine

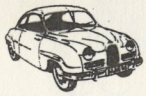
1. Gear lever in neutral.
2. Switch on ignition.
3. Depress clutch pedal.
4. Cold start knob all way out.
5. Starter control out.
6. Starter control in and cold start knob to intermediate position when engine starts.
7. Release clutch pedal.
8. Push in the cold start knob completely as soon as the engine becomes warm enough to operate on normal mixture.

NOTE

With the cold start knob pulled out, never depress the accelerator while starting the engine since the cold start device will not function properly. Be sure to push in the cold start knob as soon as possible.

Cold Engine at very Low Temperature

When stopping the engine and leaving the car outdoors in cold weather,



proceed as follows in order to faciliate subsequent starting:

1. Depress accelerator slightly.
2. Pull out cold start knob.
3. Turn off ignition and release accelerator.

For subsequent starting, follow starting instructions for "Cold Engine".

Warm Engine

1. Gear lever in neutral.
2. Ignition on.
3. Starter control out.
4. Starter control in when engine starts.

If the engine fails to start, it may have received too much fuel. In this case, keep the accelerator depressed 5—10 mm (1/4—1/2 in.), while the starter is running.

CAUTION

Never use the cold start device when the engine is warm.

A FEW DRIVING HINTS

General

The Saab 93 has excellent roadability. However, even a skilful driver needs a certain time to get acquainted with a new car. Therefore take it easy until you have become familiar with your car. Be sure not to strain the engine during the breaking in period, as you might impair its future function.

Breaking in

Every new car requires a certain breaking in period during which it should be driven with care. Pistons, cylinder bores and bearings need to be in operation for some time to produce smooth and resistive surfaces. Overloading a new engine will prevent this gradual bedding-down and will probably shorten the life of the car, especially that of the engine.

During the breaking in period which covers the first 3.000 km (2.000 miles), avoid driving at too high engine speeds. This, however, does not mean that the engine, when driving uphill for example, should be pulling hard before shifting down. Select the gears to achieve sufficiently high engine speed at low road speeds so that you have the feeling, the engine works without being strained.

The following running-in speeds may serve as a general guide.

1st speed 0—20 km/h (0—15 mph)
2nd speed 10—50 km/h (5—30 mph)
3rd speed 25—75 km/h (15—45 mph)

Avoid giving full throttle during the first 3.000 km (2.000 miles)

Driving Economy

To achieve the best economy with regards to fuel consumption as well as wear, the Saab 93, as any other car, should be driven with care. Avoid excessive acceleration and high engine speeds especially in low gears. As previously described, the car has a free wheel device and further improvement of the driving economy is thereby possible. The car is also equipped with a preheater for heating the carburetor air to prevent icing in the carburetor. Increased fuel consumption and poor idling are generally the only noticeable effects of this icing, which is most likely to occur under very damp weather conditions.

Driving on Slippery Roads

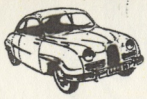
On slippery roads, or when such conditions are likely to occur, it is more important than ever to maintain the car in a proper running condition, Especially with regard to the brakes and the tires to avoid unequal brake power. A driver who feels he can control his car better by braking with the engine can do so by locking the free wheel. There is no general rule which method is to be used and each driver must therefore determine which technique suits him best.

Regardless of whether the free wheel is locked or not, the most important factor when driving on slippery roads is to be able to use the wheel brakes. Even under the most slippery road conditions, the engine brake cannot stop the car in a shorter distance than a proper braking with the wheel brakes, provided the car is two-wheel driven and has four-wheel brakes.

In case of a tail skid, the general rule is to give gas and steer in the same direction as the skid. If the front wheels skid, let up on the accelerator to regain traction and steering ability and then gradually open the throttle again.

All pedal operations should be done more smoothly and carefully when driving on slippery roads. As soon as the winter season begins, take the opportunity to practice turning and braking in some open area that is free from traffic. In a situation when the car skids, this practice may be quite useful, since you will know instinctively how to regain control.

Learn the technique of winter driving and it will become a pleasure.



Maintenance

USEFUL HINTS

1. Make sure that the ignition is switched off when the engine is not running, otherwise the crankcase may be flooded by fuel if the carburetor needle valve should be leaking. There is also the possibility that the ignition coil and the breaker points may be damaged.
1. Learn the quickest way to start the engine. If the engine is cranked too long without starting, it will become flooded and more difficult to start.
3. Drive in high gear whenever possible without straining the engine at low engine speeds. Avoid fast driving in 1st and 2nd gear.
4. Make use of the free wheel as much as possible. Release the accelerator entirely when the car is maintaining speed without throttle. When driving on autostradas and similar highways allowing high speeds, the accelerator should be released entirely now and then in order to make use of the free wheel, and to allow the car to coast for a while with the engine idling. This driving technique effects speed very little but is beneficial to the engine.
5. Do not change carburetor jets. Adjustment and setting, if required, should be carried out by qualified mechanics.
6. Keep the brakes adjusted so that they do not drag.
7. Keep the battery well charged. A poorly charged battery cannot start the engine quickly. It may also freeze at low temperatures.

ENGINE

The most favorable operating temperature for the engine is approx. 90°C (195°F). Keep the coolant temperature too high rather than too low. Do not forget to fit the two covers in the ventilation ports of the wheel housing walls behind the radiator when the winter season begins.

The engine should always be kept in a good operating condition. For normal driving, it should be decarbonized after every 24.000 km (15.000 miles). Carbon in the combustion chambers, ducts and exhaust pipe increases the exhaust resistance and impairs the efficiency and economy of the engine. Carbonization can be reduced by avoiding slow driving in 3rd gear and by using oil and gasoline of good quality.

For decarbonizing and other major maintenance operations, the car should be taken to an approved service shop.

FUEL SYSTEM

Fuel Pump

In the fuel pump there is a filter 16, which can be removed by screwing out the plug 17. This filter should be cleaned every 12.000 km (8.000 miles) or whenever impurities in the fuel are suspected. If the fiber washer 15, fitted between the plug and the pump housing, is loosend, make certain that it is properly replaced before inserting the plug. The contact points in the breaker mechanism should also be checked and if necessary adjusted after every 12.000 km (8.000 miles). In case the owner wants to carry out this operation himself, the procedure is as follows:

1. Check that the ignition is switched off so that the cable to the fuel pump is dead.
2. Remove the terminal nut 21, which holds the electric cable.
3. Remove the cable and the nut 22 after which the cover 9 can be removed.
   When carrying out the following operations, the greatest cleanliness should be exercised to prevent grease or impurities from entering the breaker mechanism.
4. The contacts 6 and 7 can now be cleaned by pulling a strip of stiff paper or very fine emery cloth between their faces. Should the points be burnt, or otherwise be in poor condition, the pump should be checked by a service garage.
5. Assemble cover 9, nut 22 cable, and nut 21 to their original positions. Tighten the terminal nut 21 firmly to assure satisfactory contact.

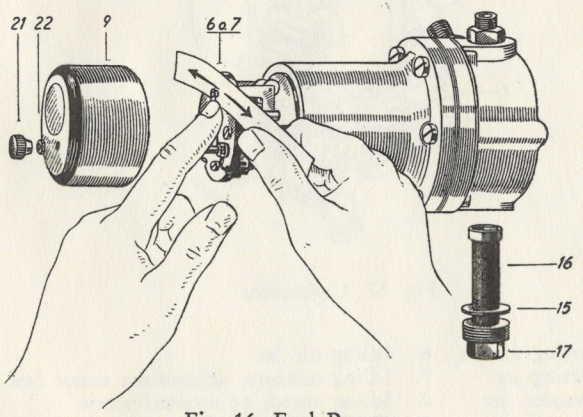
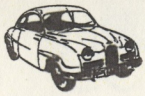


Fig. 16. Fuel Pump
The numbers refer to the text.



Carburetor

It is essential that the carburetor is kept free from impurities. For this reason, a filter 10 is provided in the carburetor feed pipe connection. This filter should be inspected regularly and cleaned whenever necessary as should also the jets. The design of the Solex carburetor allows the removal of all jets, except the idling air jet, without dismantling. Positions and designations of the jets are shown in figs. 7 and 17. It is important that any carburetor adjustment be carried out in accordance with the manufacturer's recommendations. Otherwise, the proper function of the carburetor and thereby engine operation may be impaired. Faulty carburetor adjustments may lead to abnormal fuel consumption and rapid wear of the engine. Therefore let an approved service garage carry out any major carburetor adjustment.

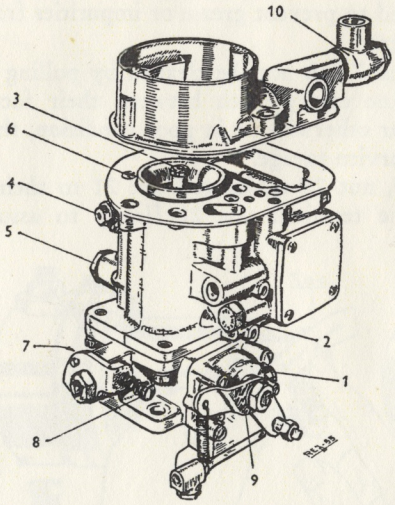


Fig. 17. Carburetor

1. Starting air jet
2. Starting jet
3. Emulsion jet
4. Idling jet
5. Main jet
6. Idling air jet
7. Idling mixture, adjustment screw (see fig. 7.)
8. Idling speed, adjustment screw
9. Cold start lever
10. Pipe connection with filter

SAAB 93B

The present supplement gives information about the modifications from serial number 36751, the 1958 model, of which the following divergences are worth mentioning.

1. **The Body** has been modified in order to enable the use of a new, one-piece windscreen.

2. **The Electrical System,** see Fig. 1, has been re-arranged on account of the new type om windscreen wipers, the theft-proof ignition lock combined with the ignition coil, and the introduction of flashing direction signals.

The new windscreen wiper motor has a greater power and works faster and more silently compared with the old one. It is mounted on the cowl front, to the right of the fresh-air heater.

The theft-proof ignition lock consists of an ignition lock, an armoured cable and an ignition coil, which together form one unit. The coil is mounted on the cowl member front to the left of the fresh-air heater.

The flashing direction signals are combined with the front parking lights and the tail lamps respectively. The front parking lights are separated from the head lamps and are now mounted in the front fenders.

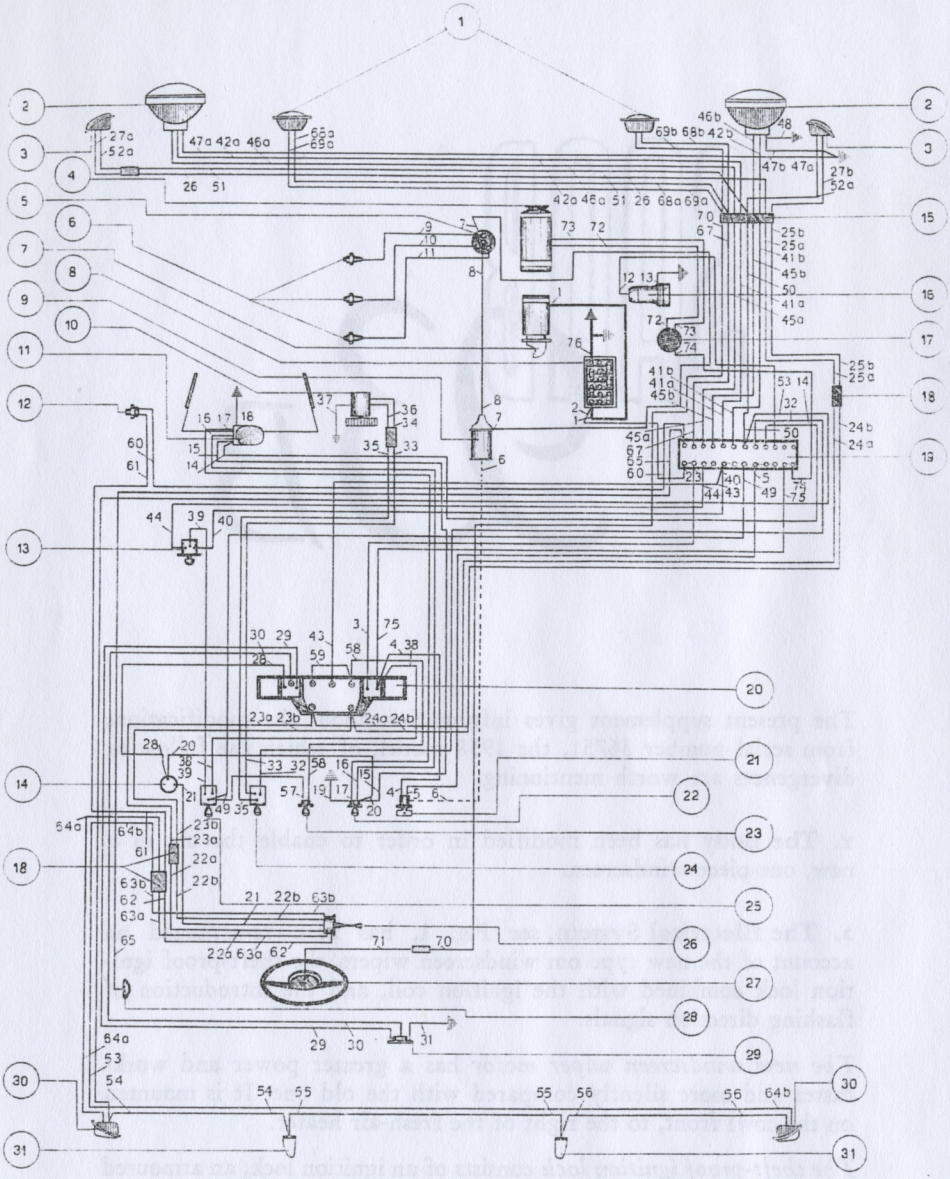


Fig. 1. Wiring Diagram.

The cable numbers refer to the colour diagram and the encircled numbers are explained on the following page.

Colours of cable insulations as per Fig. 1.

Red	2, 3, 5, 8, 9, 10, 11, 14, 15, 20, 28, 33, 34, 39, 60, 61, 62, 65, 67, 68a, 68b, 72.
Black	1, 7, 13, 18, 19, 22a, 23a, 24a, 25a, 26, 27a, 31, 32, 37, 47a, 47b, 48, 69a, 69b, 70, 71.
Green	16, 21, 49, 50, 51, 52a, 52b, 53, 54, 55, 56, 57, 58, 59.
Grey	4, 12, 29, 35, 36, 38, 45a, 46a, 63b, 64b, 74, 75.
White	22b, 23b, 24b, 25b, 27b, 40, 41b, 42b, 43.
Yellow	17, 30, 44, 45b, 46b, 63a, 64a, 73.
Blue	41a, 42a.

Explanations to the encircled numbers of Fig. 1.

1. Horns
2. Head lamps
3. Direction signals and side lamps
4. Generator
5. Distributor
6. Spark plugs
7. Starter
8. Battery
9. Ignition coil
10. Heater fan motor
11. Wiper motor
12. Stop light switch
13. Dimmer switch
14. Flasher
15. Connection box
16. Fuel pump
17. Relay
18. Connector
19. Fuse box
20. Instrument unit
21. Ignition lock (theft-proof)
22. Wiper switch
23. Instrument light switch
24. Heater fan switch
25. Light switch (head lamps)
26. Direction signal switch
27. Horn push
28. Dome light with switch
29. Tank unit, fuel gauge
30. Direction signals and tail lamps
31. License plate lights

3. An adjustable Back Seat has been obtained through a device under the back cushion, which enables the selection of three different heights. The device is shown principally in Fig. 2.

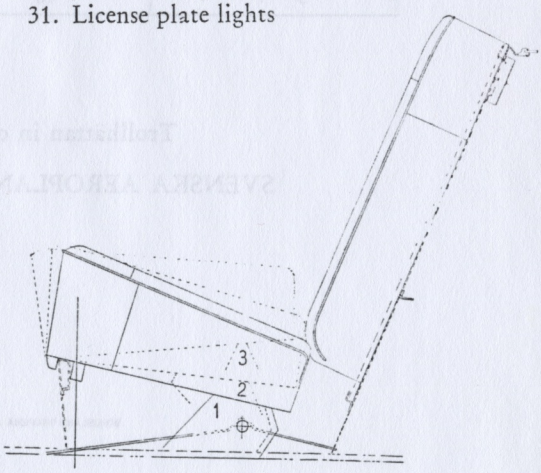


Fig. 2. Device for height adjustment of rear seat cushion.

Also the back rest is modified and the leather strap for keeping the cushion in position has been removed; instead, the back of the cushion is provided with two hooks. When removing the cushion it should therefore be lifted up before it is pulled forward. It is also possible to lock the cushion from the luggage compartment, so that it cannot be removed from inside the car.

4. **The Fuel Tank** is equipped with a built-in mixer, which facilitates refuelling. At any average temperature below —5°C (23°F) the oil has to be diluted with at least an equal amount of petrol before being poured into the tank.

NOTE: THE OIL MUST ALWAYS BE POURED INTO THE TANK BEFORE THE PETROL.

During the running in period, the first 3000 km (2000 miles), the fuel mixture ratio should be 1: 25, i.e. 4 % by volume as described previously. Thereafter, however, the mixing ratio is reduced to 1: 33, i.e. 3 % as per the following table:

Fuel quantity	Oil quantity	Viscosity grade
30—36	1	
25—29	0,8	
20—24	0,7	
17—19	0,6	Motor oil
14—16	0,5	SAE 30 or 40
11—13	0,4	
8—10	0,3	
6—8	1/4	
3—4	1/8	

Trollhättan in october 1957

SVENSKA AEROPLAN AKTIEBOLAGET

BOHUSLÄNS GRAFISKA AB

Air Filter

The filter element is combined with the cover of the induction silencer which is secured by means of clips. It is essential that the filter be cleaned at least every 3.000 km (2.000 miles) to prevent dust particles from entering the engine and cause exessive wear of the cylinder. Very dry and dusty conditions will require more frequent cleaning of the filter. For cleaning, remove the element, wash it in gasoline, then blow it clean of any dirt and allow it to dry. It should then be dipped in engine oil SAE 10 or equivalent, and surplus oil allowed to drain off. Wipe out the inside of the silencer and check whether the rubber and felt rings for the filter and cover are in good condition. Reassemble the unit.

Idling Adjustment

Idling adjustment should always be carried out when the engine is warm. The produce is as follows and the number refer to fig. 17.

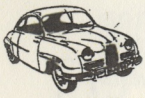
1. Set the idling speed relatively high by means of the adjusting screw 8.
2. Adjust the engine to run evenly by means of the adjusting screw 7. This is achieved when the screw is opened about 2 turns. Note, that this screw cannot be seen in fig. 17.
3. Adjust the engine speed with the screw 8 until the proper idling speed, 700—800 rpm, is attained.

COOLING SYSTEM

General

The coolant is poured in through the radiator filler and drained through the drain cock at the lower left side of the engine. In both cases the heat control 3, fig. 35, should be in the "Hot" position, and make sure that the filler cap is loosened when draining. Adding new coolant should be done in two steps. After radiator has been completely filled, the engine should be started and raced moderately for 4—5 seconds. Then add more coolant to fill up the heater element. Only clean coolant should be used, preferably pure rain water. This will prevent the formation of lime deposits in radiator and cooling jackets. Never fill a considerable amount of cold liquid into the system when the engine is hot. This may cause the cylinder block to crack.

Greatest care should be exercised when removing the filter cap in case the coolant is boiling. Unscrew the cap carefully to let out any steam before the cap is removed.



Remember

1. That the heat control should be in the "Hot" position when draining and filling the cooling system.
2. That filling of coolant should be done in two steps, to allow the heater element to be filled up.
3. That the filler cap should be loosened when draining.

Cleaning the Cooling System

The coolant should be changed twice a year, spring and autumn and in connection with this, the system should be cleaned by flushing. Cracked hoses and defective fittings should be replaced by new ones. To reduce formation of rust in the cooling system a rust inhibitor or glycol should be used. Disconnect the hoses at the clamps. Flushing should then be carried out in the direction opposite that of normal flow to facilitate the removal of deposits that may have formed. The cooling jackets of the cylinder block should thus be flushed through the upper port and

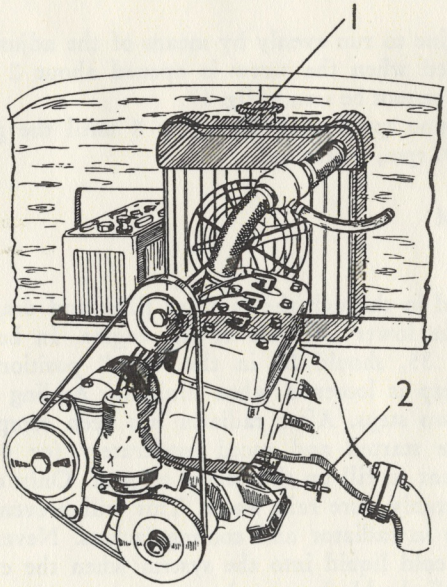


Fig. 18. Cooling system
1. Filler neck
2. Drain cock

downward and the radiator through the lower ports and upward. Should flushing prove insufficient to remove the deposits, the system should be checked by a service garage with a special equipment for cleaning cooling systems.

The thermostat consists of an aneroid with valve totally enclosed in a sheat metal casing. The thermostat should be replaced in case of incorrect function since it cannot be dismantled for repair.

Radiator Repairs

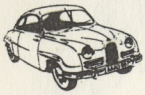
A leaky radiator core should be repaired by soldering. Patent solutions added to the coolant in order to seal the radiator should be used only in case of emergency. The use of such solutions may clog the cooling jackets and pipes and cause boiling.

Anti-freeze Solutions

During the winter season when the temperature often falls below the freezing point it is necessary to fill the cooling system with a freezeproof mixture instead of water. The water in the system may otherwise freeze and by expansion damage the radiator core or the cylinder block. Methylated spirit or ethylene glycol may be used as anti-freeze liquids. Methylated spirit, however, is not very suitable because of its low boiling point especially when driving with high coolant temperature, which is desirable during the cold season to make effective use of the heater. See page 59.

Glycol, on the other hand, has a boiling point above that of water and only water need therefore be added when replenishing. The disadvantage with glycol is that it is rather expensive and like methylated spirit, it can spoil the finish of the car.

Ethylene glycol volume %	Freezing point °C	Freezing point °F	Boiling point °C	Boiling point °F	Spec. grav.
10	— 4	25	101	214	1,012
20	—10	14	102	216	1,027
30	—17	2	103	217	1,041
40	—26	—15	104	219	1,055
50	—39	—38	106	223	1,068
60	—56	—68	109	228	1,076



Rust Inhibitors

To prevent corrosion and accumulation of lime and scale in the cooling system a suitable rust inhibitor should be used. This is essential, since clogging of the system, especially the pump and the thermostat, must not be allowed. Rust inhibitors of several well known makes are commercially available and should be used in accordance with the particular manufacturer's directions.

TRANSMISSION

The transmission lubricant is filled through the inlet 12, and drained through the drain hole 14, fig. 5. For checking the oil level, an inspection plug 13 is provided on the left side of the case. Check the oil level in the transmission every 3.000 km (2.000 miles) by removing the inspection plug and inserting a wire through the opening. The oil level should not be lower than approx. 5 mm (1/4 in.) below the opening. Add oil when required, but never mix different lubricants.

The oil should first be changed after 2.500—3.000 km (1.500—2.000 miles) and thereafter every spring and autumn or after every 12.000 km (8.000 miles). Drive the car 15 to 20 minutes before draining off the old oil and flush afterwards with clean flushing oil. Fill with oil until it flows out through the inspection opening. See Lubrication Chart, page 63.

The transmission has a total capacity of approx. 2 liters (2 U.S. qts.).

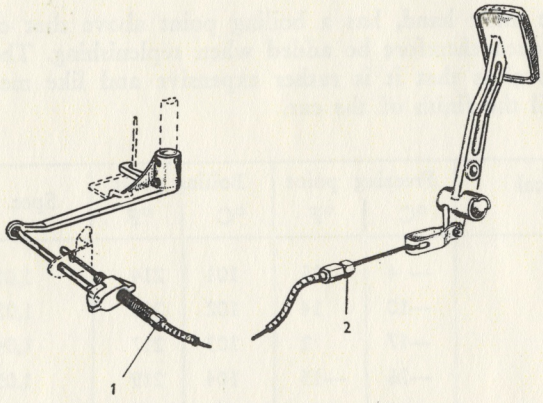


Fig. 19. Clutch pedal with adjusting nut
1. Adjusting nut
2. Sheath connection to firewall

Clutch

The clutch pedal should have a play of about 25 mm (1 in) which is adjusted with the nut 1, fig. 19. Screwing in the nut *increases* the play. To avoid excessive wear of the clutch faces and the release bearing, the play should be checked regularly.

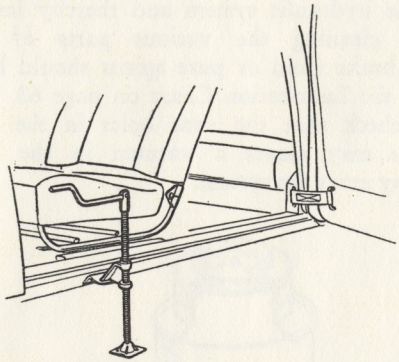


Fig. 20. Positioning of the Jack

JACK AND SPARE WHEEL

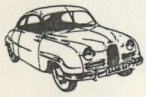
When jacking up the car for a wheel change, brake adjustment or for other reasons, the jack should be fitted to the bracket located under each floor member see fig. 20. When lifting one side of the car, the coil spring suspension enables the wheels to drop down sufficiently to be easily accessible. The door should be opened when fitting the jack.

When using a garage jack make certain that it does not damage the underside of the body. Strongpoints for the jack are provided in front as well as in the rear. The front strongpoint is a bent plate behind the muffler and the rear one is located on the body center line, just in front of the rear axle tunnel. In case the garage jack is provided with dogs, a piece of wood should be placed on the top of the lifting head when lifting the rear end of the car.

The spare wheel, the jack, and a tool kit are carried under the luggage compartment floor, the rear part of which forms a lid.

SUSPENSION

Coil springs and bearings for spring arms, rear axle and links require no particular service since rubber attachments are employed throughout. Should difficulties with the suspension be experienced, the car should be checked by an authorized service shop.



BRAKE SYSTEM

Replenishing Brake Fluid

Check the fluid level in the reservoir every 3.000 km (2.000 miles) and add fluid when required. The reservoir should always be kept properly filled. Inferior brake fluids should never be used, since they can ruin the rubber parts of the hydraulic system and thereby impair its proper function. Also when cleaning the various parts of the hydraulic system only first-class brake fluid or pure spirits should be used. Follow the directions given in the Lubrication Chart on page 63. When checking the fluid level, also check that the vent holes in the reservoir cover are not clogged. This may create a vacuum in the reservoir when braking and thus air may enter the system.

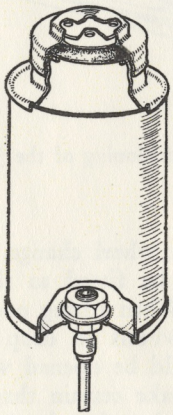


Fig. 21. Brake Fluid Reservoir

* *Bleeding of Brake System*

If air has entered the hydraulic system, the brake pedal will be spongy or brake power is obtained only if the pedal is depressed two or more times. Bleeding of the hydraulic system is then necessary and should be done as follows:

1. Check that the reservoir is well filled and make sure that the vent holes in the cover are not clogged.
2. Connect a hose of suitable size to the bleeder screw 1, fig. 22, inside the left rear wheel.

* See page 64.

3. Immerse the free end of the hose in a glass jar filled with brake fluid.
4. Open the bleeder screw 1/2 — 1 turn.
5. Have the pedal pumped with long even strokes until the discharged fluid is free from air bubbles. The end of the hose should be kept immersed during the bleeding.
6. Tighten the bleeder screw during a downward stroke.
7. Bleed also at the front wheels in this manner and in the order right front and left front. Check that the fluid level in the reservoir does not get too low.
8. Check that all bleeder screws are properly tightened and replenish brake fluid. Never use the fluid collected in the jar.

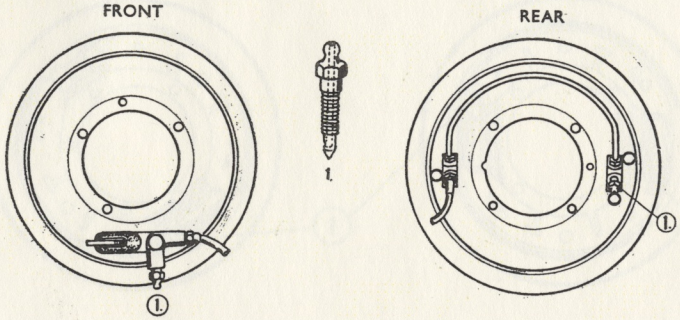


Fig. 22. Location and design of bleeder screws

* *Brake Adjustments*

If the brake power has gradually decreased during an extended period of driving, it is likely that the brake linings are worn.

The brakes should then be adjusted in the following manner:

Foot Brake

1. Jack up the car until two wheels are off the ground.
2. Remove one wheel bolt, and turn the wheel until the bolt hole faces one of the adjusting screws (two at each front wheel, one at each rear wheel).
3. Turn the adjusting screw with a screwdriver until the wheel is locked. Then unscrew one or more notches until the wheel rotates freely.

* See page 64.

4. When all four wheels have been adjusted, check that the brake pedal play is 5—10 mm (1/4—1/2 in.) otherwise the brakes will drag when the pedal is released.

If the wheel cannot be locked with the adjusting screw, the brake linings are badly worn and should be replaced without delay. To assure even brake power relining should be carried out on both front wheels or both rear wheels but *never* on one wheel only. When relining, use only Saab original linings, or linings recommended by SAAB.

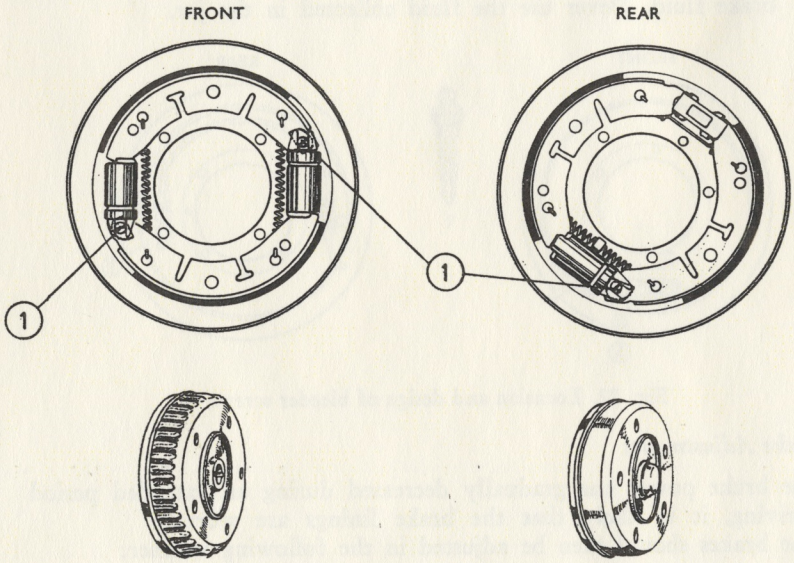


Fig. 23. Foot Brake Adjusting Screws

Parking Brake

The brake lever movement is transmitted to the rear brake shoes by Bowden cables. The play of the brake lever is adjusted by the nuts 1, fig. 24, accessible from the driver's seat. It should be possible to pull the brake lever two notches before the brakes drag. This adjustment should not be carried out unless the foot brake has first been adjusted as previously described.

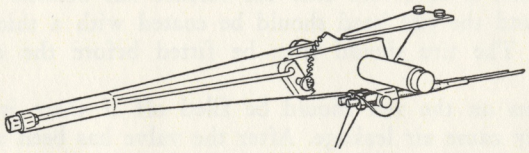


Fig. 24. Brake Lever with Adjusting Nuts

WHEELS AND TIRES

Saab 93, as previously mentioned, is equipped with tubeless tires. In case of puncture the air leaks out very slowly from this type of tire since the hole in the synthetic rubber layer is squeezed almost tight by the tire pressure. If the penetrating object remains in the tire, pressure may be retained long enough for braking safely, or even proceeding to a service station, before tire pressure is completely lost. Futhermore, the repair of the tubeless tires is so simple that in most cases removal of the wheel is not required.

Fitting and repair of tubeless tires should preferably be carried out by a tire repair shop. The following directions are intended for those who wish to carry out minor repairs themselves or for those occasions when no service is available.

Tire Pressure

Check the tire pressure once a week with a reliable pressure gauge and follow carefully the directions given below.

A tire with correct pressure makes road contact with its entire tread. Uniform wear and effective traction is thus achieved.

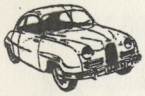
Tires with too high pressure cause a bumpy ride and wear excessively in the middle of the tread. Too low a pressure causes extra wear at the sides of the tread and makes the car sway when cornering.

Correct Tire Pressures

Front wheels	1.8 kg/cm² (26 lbs./sq.in.)
Rear wheels	1.4—1.7 kg/cm² (20—24 lbs./sq.in.)

Fitting Tires

When fitting a tire to the rim, make sure that the surfaces of the tire beads are clean and smooth. The tire bead and the inside of the rim edge should be thoroughly cleaned and any rust should be removed with a wire brush and steel wool. Particular attention should be paid to the area around the valve hole.



If the corrosion is so severe that the surface has become rough, the affected areas and the tire bead should be coated with a thick layer of rubber cement. The tire should then be fitted before the cement has dried.

Welding seams on the rim should be filed off if there is reason to believe they may cause air leakage. After the valve has been attached to the wheel rim, the tire is fitted. This operation should be carried out very carefully to assure that the tire bead is not damaged by sharp edges on the tools. Check that the tire beads are properly pressed up against the corresponding seatings of the rim. The most simple way of doing this is to place the wheel in a 45° angle against a wall and push in the rim with your foot. The wheel is then turned around and the procedure repeated for the other side. The initial inflation should be done with the valve core removed to allow the air to enter quickly so that the tire is properly seated in the rim. After the core has been inserted, inflate to 2.5—3 kg/cm² (35—40 lbs./sq.in.) and then bleed the tire until the proper pressure is obtained.

Repair of Leaks

If a tire does not keep the pressure, it is possible to locate the fault by merely inspecting the tire and after the puncturing object, if any, has been removed, the tire can often be repaired without removing the wheel. To locate minor leaks it may be necessary to remove the wheel and immerse it in water.

Tires

A puncture can be repaired without difficulty by inserting a rubber plug in the hole after the plug and the hole have been coated with rubber cement. A special needle is required for this operation. Repair kits containing a needle, plugs of various sizes, and rubber cement, i.e. everything required for repairing tire punctures, are available in the market. Directions for use will also be found in the kit.

Wheel Rim

Air leakage caused by a minor deformity of the rim edge can be remedied by straightening the edge with a hammer against an anvil. A leaky rim, a small hole etc., can be repaired by hot riveting. If an existing rivet is leaking, the rivet head can be hammered out aginst a dolly block. For safety reasons a cracked rim should be replaced and not repaired. A rim leak must not be welded or brazed.

Valve

Air leakage around the valve can often be stopped by cleaning the rubber washers and valve and then coat with rubber cement. If the valve has a hexagon nut, this can be tightened. In case these operations fail to stop the leak, the rubber washers or the valve must be replaced. Before fitting a new valve, be sure to inspect and clean its contact surface of the rim.

Interchanging Wheels and Tires

The front tires are subjected to heavier wear than the rear ones, and the right and left tires also wear differently. Interchanging of tires should therefore be done every 6.000 km (4.000 miles) as shown in fig. 25, to attain about equal life for all tires.

Fig. 26 shows the sequence for tightening the wheel bolts.

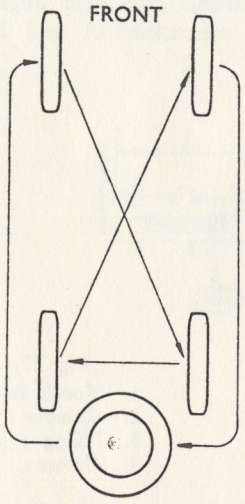


Fig. 25. Interchanging Wheels

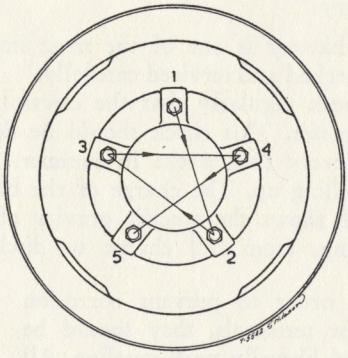


Fig. 26. Tightening Wheel Bolts

Front Wheel Alignment

It is essential that the alignment of the front wheels is correct, mainly for the three following reasons:

1. Incorrect front wheel alignment is dangerous since the driver may have difficulties keeping the car under control.
2. Driving will become tiresome, since incorrect wheel alignment badly affects roadability.
3. Wear on tires and steering mechanism becomes excessive, resulting in extra expenses for tire replacement and repairs.

To avoid incorrect front wheel alignment, the car should be taken to an authorized service garage for inspection and possible adjustment every 6.000 km (4.000 miles) or whenever there is reason to belive that the alignment is incorrect.

The various alignment angles are shown in the figure below. Note, that the dimensions A and B are measured between the wheel rims.

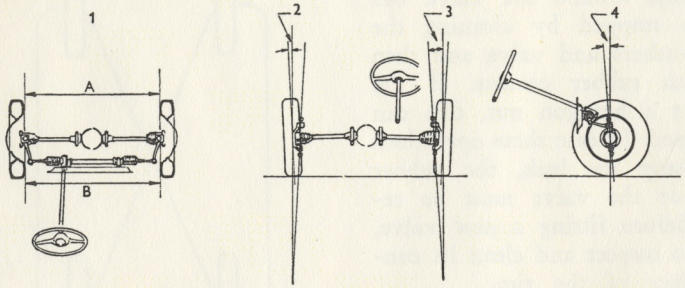


Fig. 27. Front wheel alignment

1. Toe-in B—A = 2 mm ± 1 (0.8 in ± 0.04)
2. Camber = 3/4°
3. "King pin" inclination* = 7°
4. Caster = 2°

ELECTRICAL SYSTEM

Battery

The battery is one of the most important parts of the car and should be checked and serviced carefully.

Check regularly that the electrolyte level is 6—8 mm (1/4 in.) above the plates. This check should be done at least once a month in winter and every two weeks in summer. Only distilled water should be used for filling up. The charge of the battery is measured with a hydrometer which shows the specific gravity of the electrolyte. The specific gravity readings from full charge to discharge are listed in the table below.

In order to prevent corrosion of the terminals, they should be coated liberally with vaseline. All grease, dirt, etc. should be removed before coating. Check also that the battery is firmly secured and that the terminal nuts and the ground connections are properly tightened.

Battery condition	Specific gravity
Fully charged	1.28
3/4 charged	1.24
1/2 charged	1.21
1/4 charged	1.16
Discharged	1.12

* Since this car has ball joint suspension of the wheels, the term king pin refers to an imaginary line through the centers of the ball joints. See fig. 27.

Avoid long and heavy discharges of the battery because they shorten its life considerably. In case of repeated attempts to start the engine, the battery should be allowed to recover between attempts.

Generator

The generator is located to the right of the engine and is driven by a v-belt from the crankshaft pulley. To tighten the belt, loosen the bolts 1 and 2, fig. 28, and pull the generator outwards. The correct tension is attained when the belt can be pressed inwards about 6—8 mm (1/4 in.) on the longest run. See fig. 28. Do not overtighten the belt, since this will cause excessive load on the generator bearings and heavy belt wear. When the tension has been correctly adjusted, tighteen the bolts 1 and 2.

Should the generator or relay be defective, take the car to an approved service garage without delay.

The generator should be lubricated during overhauling.

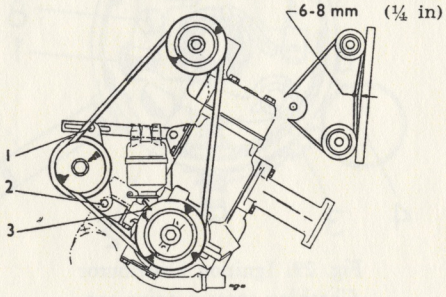
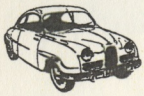


Fig. 28. Adjustment of Belt Tension
1. Adjusting bolt
2. Fastening bolts
3. Index for ignition timing (piston in cyl. 2 in T.D.C.)

Ignition Distributor

The ignition distributor is mounted to the right of the engine. The rotor is driven by the crankshaft via a worm gear and a pinion and rotates clockwise. The automatic spark advance is regulated centrifugally and the firing sequence, as shown in fig. 30, is 1—2—3. (No. 1 cyl. the rear one). To prevent moisture from entering and causing a short circuit, a shield is mounted in front of the distributor.

It is essential that the distrubutor gear is lubricated regularly every 3.000 km (2.000 miles) and that the contact gap is checked every 12.000 km (8.000 miles). The distributor shaft and the lubricating felts should also be oiled at this time. See Lubrication Chart page 63.



* *Checking Contact Points*

The contact points and point gap should be checked every 12.000 km (8.000 miles). Remove the distributor cap, rotor and protective plate. Make sure that the contact surfaces of the points are clean and not burnt to the extent that they must be replaced.

When replacing contact points, do not forget to lubricate the breaker arm pivot with the same kind of lubricant as used for the lubricating felts for the breaker cam and rotor shaft.

Note. All lubrication in the distributor should be moderate.

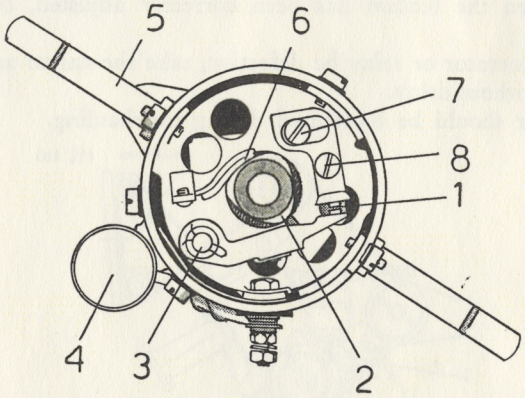


Fig. 29. Ignition Distributor
Checking contact point gap

1. Contact points
2. Breaker cam
3. Breaker arm pivot
4. Condenser
5. Clamp spring
6. Lubrication felt
7. Adjusting screw
8. Lock screw

After checking the contact points, the point gap should always be adjusted. The correct gap is 0.3—0.4 mm (0.012—0.016 in.) measured when the breaker arm peg is on the highest point of a cam lobe. Use a feeler gauge when checking. The gap is adjusted by loosening the lock screw 8, fig. 29, of the stationary point. Then turn the eccentric adjusting screw 7, until the correct gap is obtained and tighten the lock screw. Check the gap again and, if correct, fit the protective plate and the rotor.

Note. When fitting the rotor, the lock washer for the lock screw should be replaced by a new one.

* See page 64.

After adjustment of the point gap, always check the ignition timing.

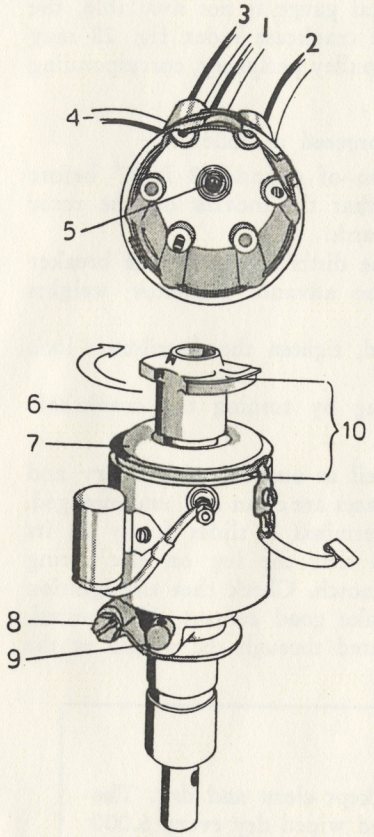


Fig. 30 Ignition Ditributor

1. Ignition cable, cylinder 1
2. Ignition cable, cylinder 2
3. Ignition cable, cylinder 3
4. Cable to ignition coil
5. Center carbon terminal
6. Rotor
7. Protective plate
8. Distributor lock screw
9. Lubrication nipple
10. Index for ignition timing

* *Ignition Timing*

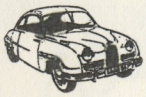
Since the timing of the three cylinders in relation to each other is fixed by the position of the cam lobes, it is sufficent to check the timing of one cylinder only. Engine and distributor are indexed with cylinder 2 as the determinant. For checking, proceed as follows:

1. With the distributor cap removed and the breaker points adjusted, turn the crankshaft until the index on the crankshaft pulley coincides with the crankcase index underneath the distributor, as shown in fig. 28. The piston in cylinder 2 is now in its top dead centre (T.D.C.).

3. Switch on ignition and by using a test lamp for indinow coincide with the index of the distributor body. This index is located on the front side of the body and to the left of the guide lug which also serves as a support for one of the clamp springs. See fig. 30.

3. Switch on ignition and by using a test lamp for indication, turn the crankshaft until the breaker points close. Make sure that the advance regulator weights are retracted

* See page 64.



by turning the rotor in reverse, i.e. counterclockwise. When the setting is correct, the points begin to open at 8°, or if a dial gauge is used, 0.5 mm (0.020 in.) before T.D.C. If a dial gauge is not available, the distance between the pulley index and the crankcase index fig. 28 may be measured. The distance measured on the pulley periphery, corresponding to 8° is about 10 mm (0.4 in.).

If adjustment of the timing is required, proceed as follows:

a. Turn the crankshaft until the piston of cylinder 2 is 8° before T.D.C. (See item 3 above). Note, that the indexes on the rotor and distributor body should face forwards.
b. Loosen screw 8, fig. 30, and turn the distributor until the breaker points open. Make certain that the advance regulator weights are retracted.
c. When the correct setting is obtained, tighten the distributor lock screw.
d. Check the correctness of the timing by turning the crankshaft a few full turns.

4. Clean the distributor cap, inside as well as outside, with a dry and clean cloth, and check that all contact faces are clean and undanmaged. Also check that the center carbon terminal 5 slides freely in its holder. Clamp on distributor cap so that the lug on the spring attachement fits in the corresponding notch. Check that the ignition cables are correctly connected and make good contact. If required, the distributor shaft should be lubricated through the nipple at the front of the distributor body.

> **Important**
>
> All high tension insulators must be kept clean and dry. The following parts should be cleaned and wiped dry every 6.000 km (4.000 miles): ignition coil bakelite cap, distributor cap (inside and outside), ignition cable, spark plug cables and spark plug insulators.

Fuses

The electrical system is protected by twelwe fuses two of which are intended for optional extras or as spares. The fuses are located in a fuse box under the hood on the right hand side of the cowl. In the cover is indicated the electric units protected by each fuse. See also fig. 31 and page 56.

Should the same fuse blow frequently, the car should be taken to a service shop without delay, for insulation test of cables and apparatus.

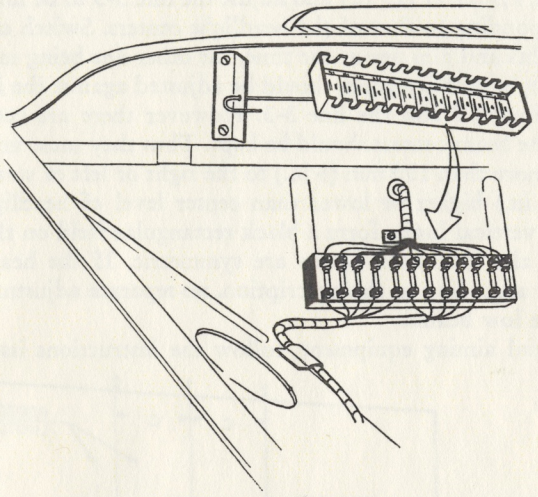


Fig. 31. Fuse Box

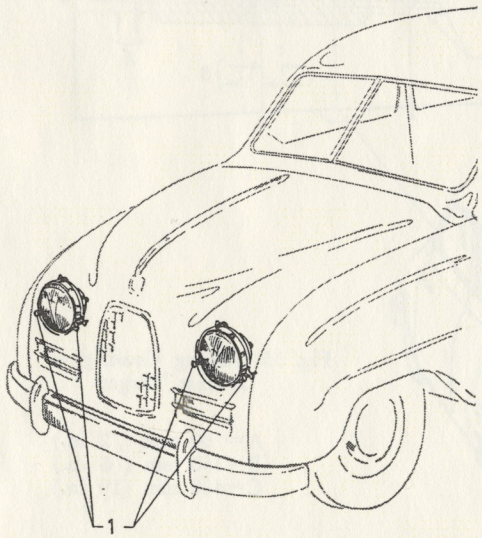


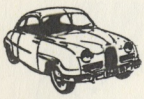
Fig. 32. Screws for adjusting Headlights

* *Aiming Headlights*

The headlights are adjustable horizontally and vertically. They are mounted to the hood by three attachments, of which the upper one is pivoted and the two lower ones provided with adjusting screws. See fig. 32.

The aiming should be carried out against a target, as shown in fig. 33, or with a special equipment giving equivalent result. The various lines of the target are the car center line 1, the two vertical headlight center lines 2-2 and the horizontal headlight center line 3-3.

* See page 64.



Before aiming, check that tire pressures are correct and place the car on a level floor and square with the target. The car should be unloaded except for the driver. Measure the distance between headlight and target, 7,5 meter (25 ft.) and adjust the line 3-3 to be horizontal on a height corresponding to that of the headlight centers. Switch on the main beam of the lights and aim one at the time, the other one being masked. The centers of the high intensity zones should be adjusted against the intersection points of the lines 2-2 and the line 3-3. However there are certain limits within which the beam centers should be kept. Thus they must under no circumstances be more than 150 mm (6 in.) to the right or left of straight ahead and 50 mm (2 in.) higher or lower than center level of headlights. These horizontal and vertical limits form a black rectangular field on the target in fig. 33. Check also that both beams are symmetric. If the headlights are aimed correctly according to this description, no separate adjustment will be required for the low beams.

For use of special aiming equipment, follow the instructions issued by the maker.

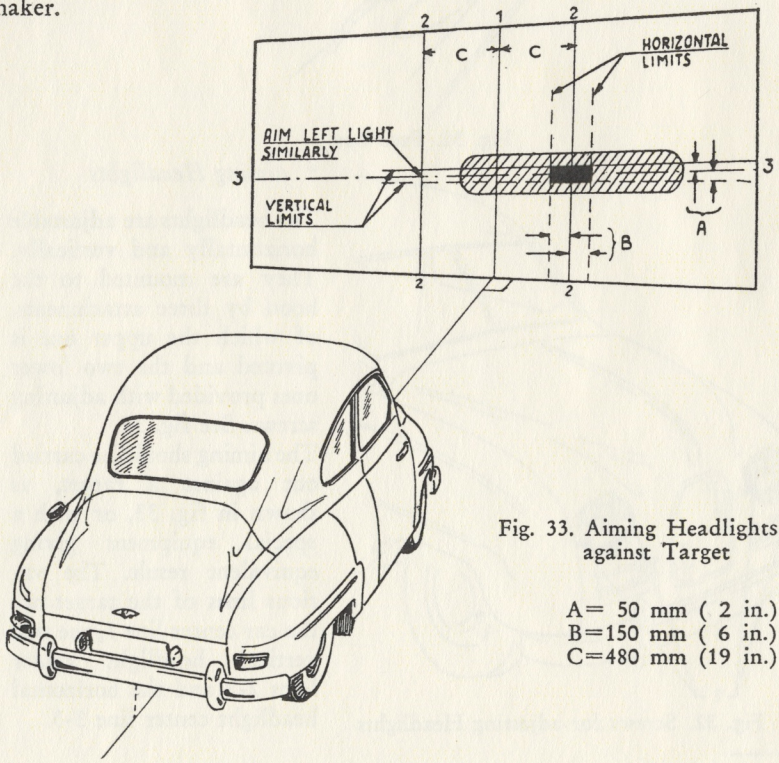


Fig. 33. Aiming Headlights against Target

A= 50 mm (2 in.)
B=150 mm (6 in.)
C=480 mm (19 in.)

Horizontal Adjustment (to the right)

Turn the left adjusting screw to the left and the right screw an equal number of turns to the right to ensure that the vertical setting is not changed.

For adjustment to the left, proceed in the opposite manner.

Vertical Adjustment

Turn the two adjusting screws an equal number of turns to the left or to the right for downward or upward adjustment respectively.

Bulb Replacements

Headlights and Parking Lights

Open the hood and remove the rubber cap behind the headlight. Withdraw the lamp holder while depressing the lock spring on the underside. Replace the bulb, depress the lock spring and insert the lamp holder. Use a clean cloth or the bulb wrapping when inserting the new bulb. Avoid touching it with your hand. Make sure that the lock spring engages properly and replace the rubber cap so that it seals tightly around the holder.

License Plate Lights

Loosen the screw and remove the cap. Replace the bulb and check that it is firmly positioned and makes good contact. Replace the cap and be sure that it seals properly against the rubber packing.

Stop and Tail Lights

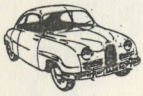
Replace the bulb after removing the two screws, the frame and the glass. Make sure that the new bulb makes good contact and that proper sealing is obtained when replacing glass and frame.

Turn Indicators

Extend the indicator arm and loosen the screw at the underside of the arm. Slide away the cover plate to gain access to the bulb. Fit the new bulb, but first make certain that the contact spring inside the arm is not oxidized. If necessary, the spring may be bent down slightly to secure the bulb firmly. Slide the cover back and lock it by tightening the screw.

Spark Plugs

The spark plugs should be cleaned after approx. 6.000 km (4.000 miles) driving. At the same time, check with a feeler gauge that the spark gap is 0.7 mm (0.028 in.) If adjustment is required it must be done



with the side electrode since the insulator may crack if the center electrode is subjected to bending. After 10.000—15.000 km (6.000—10.000 miles), the spark plugs should be replaced.

The type of spark plugs to be used is determined to a great extent by how the car is being driven. Hot spark plugs should be used for city driving and generally when the car is moderately used. Long distance, high speed driving requires cold spark plugs. For further recommendations see page 7.

BODY

Care of Finish

The car should be washed by hosing with clean water until most of the dirt is removed, the rest being wiped off with a sponge and plenty of water. Be careful not to scratch the finish. The car should then be hosed again and dried, using a clean chamois. To get a satisfactory result, washing should preferably be done in the shade.

If the car is frequently left outdoors, especially in sunshine, the finish may gradually lose its lustre, but it may be restored with a good quality car polish. The car should then be waxed.

Spots of asphalt, oil etc., should be removed without delay using a cloth moistened in gasoline, turpentine or similar solvent. Having removed the spot, rinse off the cleaner with water.

Should the finish be moderately damaged, for example by a flying stone, the damage can be cleaned and then coated with suitable air-drying touch-up paint. Practical small-size tubes containing paint and brush are available as Saab accessories.

Care of Upholstery

The upholstery in the car is plastic-coated cloth and silk fabric. The plastic-coated cloth repels dust and is oil and gasoline proof. Should the plastic surface be soiled, it can easily be cleaned with water and some synthetic detergent. If badly soiled, by oil or grease, it can be cleaned with kerosene, trichlorethylene, etc. These organic solvents, however, should not be used too frequently since they tend to stiffen the plastic. The silk fabrik upholstery should preferably be cleaned with a cloth moistened in a soap solution or some other suitable cleaner.

Chromium-plated Parts

The alkaline solution sprayed on gravel roads in summer has an unfavorable effect on chromium-plated surfaces. The best way to prevent corrosion of these parts is to wash them frequently and thoroughly with soap and water or a neutral cleaner, e.g., gasoline. When the surfaces have been washed and dried, it is a advisable to apply a wax of the same type as that used for the finish.

Never use polish on chromium-plated parts.

If the chrome has been scratched down to the metal, any rust in the scratch can be removed with phosphoric acid (one part acid to two parts of water). After this treatment, the scratch should be thoroughly washed with clean water and wiped dry. Further corrosion is prevented by coating the damaged section with clear cellulose varnish or wax.

The engine compartment should be cleaned with a brush or cloth dipped in kerosene and then rinsed with warm water. Avoid directing the water stream against electric units.

The wheel housings and the rear axle tunnel should also be hosed with water when the car is washed.

The floor mats should be washed with soap and lukewarm water. Gasoline or other rubber-deteriorating fluids should not be used. After cleaning, the mats may be coated with rubber paint.

The glass surfaces should preferably be cleaned with a damp chamois.

Trouble Shooting

The following advice and directions are a brief summary intended to help you locate and remedy minor faults which may occur during driving.

1. The engine will not start although it is cranked by starter at normal speed.
   a. Switch on the ignition. Check that there is fuel in the tank, and that the ammeter shows a negative reading.
   b. In cold and damp weather, clean the spark plug insulators.
   c. Check that the fuse for ignition coil and fuel pump is not blown.
   d. Check that the fuel line fittings to pump and carburetor are tight.
   e. If the engine has been cranked too long without starting, too much fuel may have entered the cylinders and soaked the spark plugs. Dry out the cylinders by removing the spark plugs and cranking the engine with the starter. Insert dry spark plugs.

f. Check that the cold start lever on carburetor operates correctly, Let the starter crank the engine while the accelerator is kept pressed down 5—10 mm (1/4—1/2 in.).
g. Check that the fuel pump is feeding fuel by loosening the fuel hose fitting at the carburetor and switching on the ignition for a moment.

2. Should the engine still fail to start, check if sparks appear at the spark plugs:
   a. Remove the ignition cable from one of the spark plugs and hold its terminal close to the cylinder block while the starter rotates with the ignition switched on. A spark should now jump the gap between cable and cylinder block. Repeat for the other spark plugs.
   b. If there is no spark or only a faint one, check that the ignition cables are properly inserted in the distributor cap and ignition coil. Remove the cables and clean their terminals.
   c. Remove the distributor cap and wipe it dry. Inspect and clean all connections.
3. Sparks appear, but the engine fails to start although fuel is properly fed to the carburetor.
   a. Check that the carburetor jets and ducts are not clogged. Clean the carburetor if required, see figs. 7 and 17.

If the engine misfires, the cause may be:

1. An ignition cable has loosened or become grounded.
2. A spark plug is fouled. Clean and adjust gap.
3. An ignition cable makes poor contact in the distributor cap.
4. A contact in the distributor cap is oxidized or burnt.
5. The distributor cap is cracked or damp.

Reduced engine power. Check that:

1. Ignition cables are properly connected.
2. Spark plugs are clean.
3. Carburetor icing has not occurred, if weather is damp. Connect the preheater.
4. Carburetor jets and ducts are not clogged.
5. Accelerator is not stuck which obstructs the throttle valve motion.
6. There is no short in the ignition system.

No negative reading on the ammeter when ignition is switched on. May be due to:

1. Discharged battery or a loose battery cable.
2. Poor contact at the ignition switch or at the ammeter.
3. Faulty ammeter.

No sparks at the spark plugs, although ignition is switched on and ammeter reading is correct. The cause may be:

1. Ignition cable is not properly inserted in the distributor or ignition coil or the cable terminals are oxidized.
2. Other poor connections between cables and distributor or ignition coil.
3. Ignition cable is ruptured, causing short-circuit.
4. Moisture in distributor or on spark plug insulators.
5. Distributor rotor or cap is cracked.

Ammeter fails to register when driving, although the battery is not fully charged.

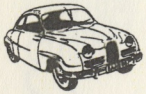
1. V-belt broken or not sufficiently tightened.
2. Generator relay defective.
3. Generator carbon brushes badly worn, stuck in their holders, or the collector is burnt.

Starter runs very slowly:

1. Battery discharged.
2. Ground connections, cable connections of battery or starter are oxidized or not sufficiently tightened.
3. The starter carbon brushes may be stuck, badly worn or dirty.
4. The commutator may be fouled.

Battery discharged. The cause may be:

1. Too low electrolyte level.
2. Slipping v-belt.
3. Defective generator relay.
4. Poorly insulated cables.
5. Some current consuming unit fails to switch off.



Fuse Replacement

For speedy remedy of fauls caused by a blown fuse, it is desirable to know which electric equipment is fused and in the fuse box cover is indicated which part of the electric system is protected by each fuse. The only part of the system, which is not fused is the instrument light. If the fuse be sound, when locating a fault, the cause may be poor contact at some cable connection. Check that the connections are properly tightened and not oxidized. When fitting a new fuse, make sure that the fuse makes proper contact.

Note. A fuse does not protect the part of a circuit before the fuse.

SAAB 93

Optional Extras for Saab 93

Heater

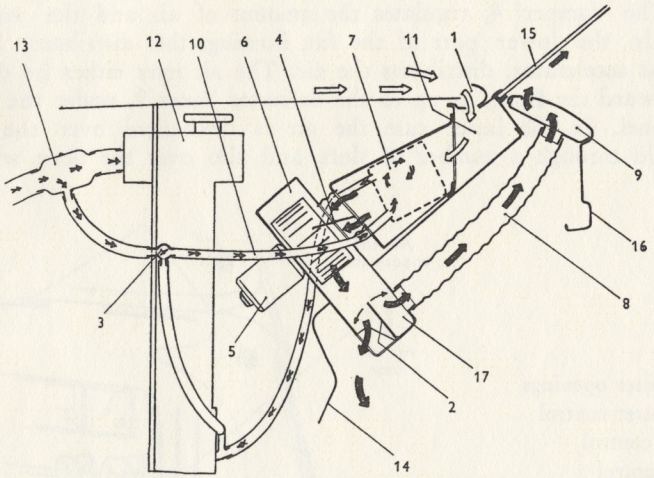
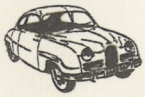


Fig. 34. Fresh-air Heater

1. Fresh air intake
2. Air distributor
3. Two-way cock
4. Damper
5. Fan motor
6. Fan housing
7. Heater element
8. Hose to defroster
9. Defroster box
10. Hose
11. Collector box
12. Radiator
13. Thermostat
14. Firewall
15. Windshield
16. Instrument panel
17. Distributor box



The fresh-air heater, particularly designed for Saab 93, comprises a heater element placed in the radiator by-pass conduit, an electrically driven fan and controls. This equipment is mounted between the radiator and the firewall.

The controls, including a switch for the fan motor, are located to the left on the instrument panel. How to operate the controls is described on this and the next page.

Through the air intake 1 just in front of the windshield, air enters a collector box 11, formed by the body plates. The heater element 7, enclosed in a housing, is located in front of the collector box, in the engine compartment. Hot coolant flows through the heater core, and the passing air is thus heated. The temperature of the heater, and thereby, the temperatur of the air can be regulated by means of a two-way cock 3, the position of which determines the flow of coolant through the hose 10, to which the heater core is connected. After having passed through the core, the air enters the car through the fan housing 6, which encloses the fan. The housing is provided with a damper and a valve. The damper 4, regulates the amount of air and the valve 2, located in the lower part of the fan housing, the distributor box 17 above the accelerator, distributes the air. The air may either be directed down toward the floor, or up to the defroster boxes 9, under the instrument panel. In the latter case the air is discharged over the entire windshield through a number of slots, and also over the door windows

1. Defroster openings
2. Defroster control
3. Heat control
4. Air control
5. Fan motor switch

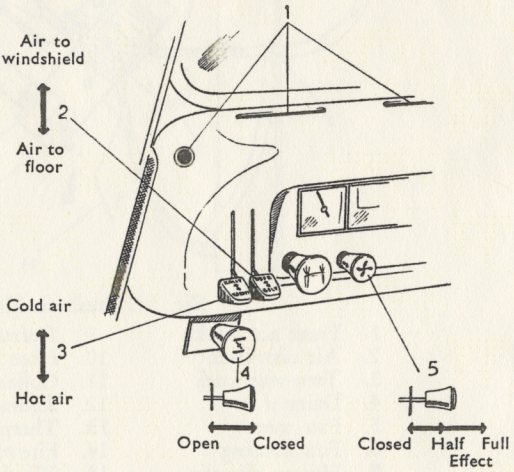


Fig. 35. Heater Controls

through a hole in each end of the instrument panel. The fresh air heater gives the following advantages:

1. Fresh, hot or cold air in the car.
2. Good visibility through the de-misted windshield and door windows.
3. No unpleasant draught.

The control labeled "Floor-Defr." distributes the incoming air. In the intermediate position, the air flow is equally divided between the outlets.

The heat control "Cold-Hot" closes or opens the cock which regulates the coolant flow through the heater element.

By pulling out the air control knob, the air flow can be limited or completely shut off.

The fan motor has two different speeds, half or full capacity, operating when pulling out the fan switch to the first or second position respectively.

Keep a Window ajar when Driving

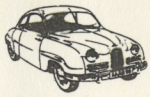
If both door windows are closed, this will cause excess pressure in the car when driving and no air can enter through the heater. One of the door windows should therefore be left ajar to enable air circulation. When driving in heavy cross winds, the lee side window should preferably be opened.

Use the Fan when Driving Slowly

At speeds above 50 km/h (30 mph), the relative velocity of the air is generally sufficient for a satisfactory heater function. The fan is required only when driving slowly or at standstill.

Keep the Coolant Temperature High

The coolant temperature should be approx. 90° C (195° F), and a coolant with a high boiling point should therefore be used. Ethylene glycol, which has a boiling point above that of water is therefore recommended as anti-freeze solution. The car is delivered with two covers for closing the ventilation ports in the wheel housing walls during the cold season. By opening the hood, the ports will be visible on each side behind the radiator. Do not forget to remove the covers in the summer. Closing the ports allows the engine to reach the proper operating temperature appreciably quicker.



Bed Arrangement

By arranging seats and cushions with the aid of a bed outfit, a very comfortable twin bed can be obtained in the car in a few minutes. The bed outfit may be stored under the back seat. Before converting the car, it should be parked on a slight downhill slope. Shift to reverse gear and place suitable stones in front of the wheels as the parking brake cannot be used when the car is converted.

Always keep a window ajar for air circulation.

Parcel Outfit

The car can easily be altered for transport of bulky goods. By removing the back seat cushions and installing a so-called parcel outfit you can obtain a large and stable floor for goods in the rear part of the car. The parcel outfits is easily removed after use.

SAAB 93

Lubrication Directions

Proper lubrication is very important for maintaining the car in good condition. It is less expensive to lubricate the car regularly and with first class lubricants than to pay for repairs caused by neglecting the lubrication directions.

The Lubrication Chart and fig. 36 on the following pages show the lubrication points on the Saab 93, and also indicate the proper lubricants to be used, method of application and intervals between librications.

To check the oil level in the transmission, remove the inspection plug and check with a wire that the level is not lower than 5 mm (1/4 in.) under the inspection plug, which corresponds to a capacity of 2 liters (2 U. S. qts.). In general, SAE 90 is recommended throughout the year, but if the car is frequently left outdoors in cold weather, SAE 80 should be used.

Non-freezing grease should be used for the steering gear, clutch cable and brake cables to assure proper function during the winter.

If the car is stored for an extended period, it should first be thoroughly lubricated. To prevent corrosion of the engine, it should be prepared as follows:

1. Remove air filter.
2. Start engine and let it run at fairly high speed (3.000—3.500 rpm).
3. Pour a suitable rust inhibitor or engine oil SAE 40 or SAE 50 into the carburetor and let the engine take in oil until it stops. The quantity required is about 0.2 liters (1/2 U. S. pint). Note, that the accelerator should be kept in the same position all the time.
4. Switch off the ignition and replace filter.

After this preparation, the engine should not be started until the car is to be used again.

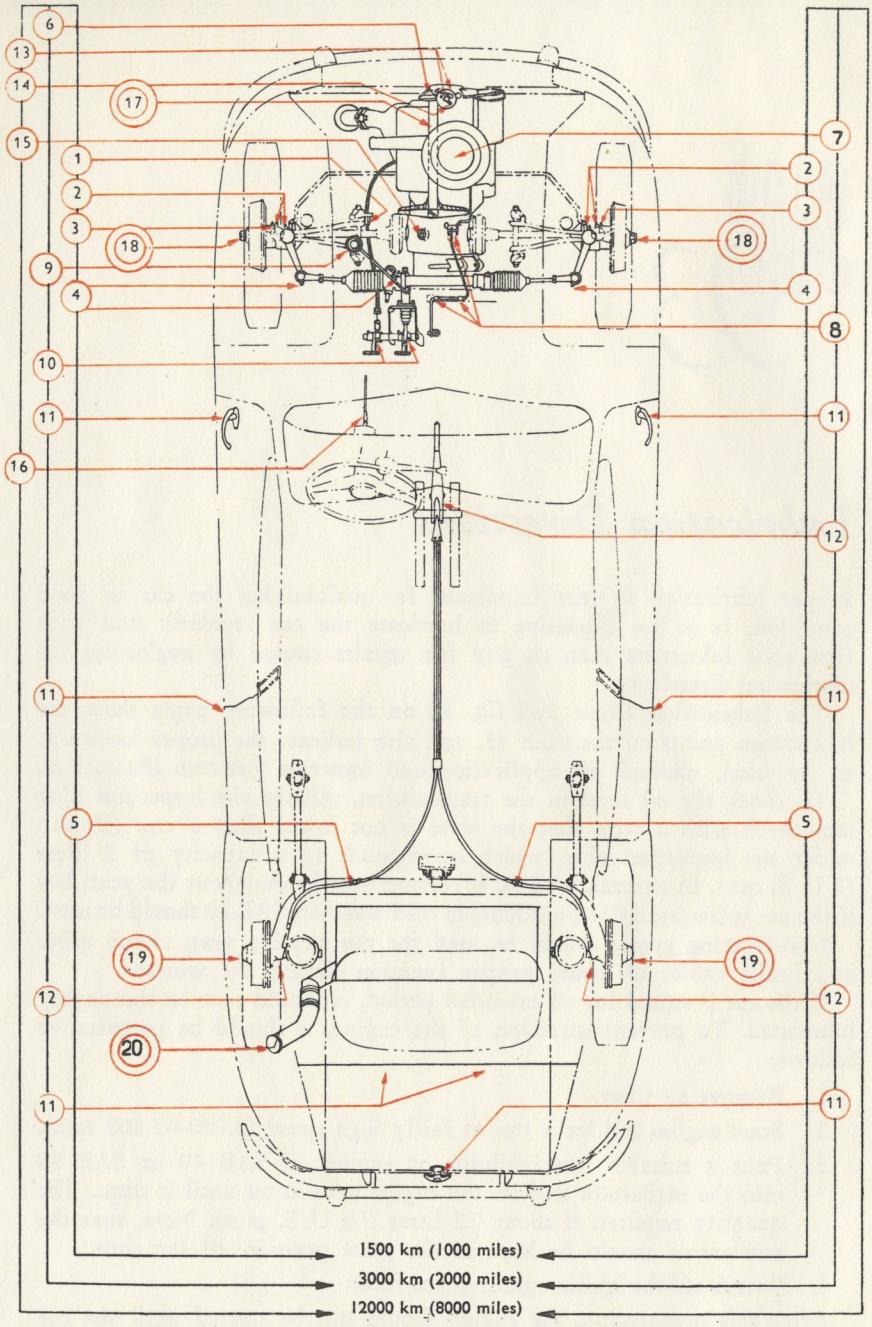


Fig. 36. Lubrication Points. The numbers refer to the Lubrication Chart

Lubrication Chart

Lubrication intervals: Every 1.500 km 1.000 miles	Every 3.000 km 2.000 miles	Every 12.000 km 8.000 miles	No. in fig. 36	Lubrication point	Number of	Lubricant	Method of lubrication
×			1	Clutch cable	1	Universal or chassis grease	Grease gun
×			2	Upper & lower ball joints, L & R	4	—"—	—"—
×			3	Drive shaft, outer joint, L& R		—"—	—"—
×			4	Steering gear and drag rods	3	—"—[1]	—"—
×			5	Brake cable	2	—"—[1]	—"—
	×		6	Distributor gear	1	—"—	—"—
	×[2]		7	Suction silencer	1	SAE 10	Dip in oil
	×		8	Accelerator	5	SAE 40	Oil can
	×		9	Hydraulic brake system	1	SAE 70 R 1[3]	Replenish
	×		10	Pedals	3	SAE 10	Oil can
	×		11	Hinges and locks	9	SAE 40	—"—
	×		12	Brake levers	3	—"—	—"—
		×	13	Distributor shaft	2	—"—	—"—
		×	14	Distributor cam assembly	2	Bosch Ft 1 v 4	Grease felts
		×[4]	15	Transmission	1	SAE 90[5]	Oil change
		×	16	Speedometer cable	1	SAE 10	Oil can
Approx. 48.000 km (32.000 miles)			17	Fan shaft bearings	2	Universal or ball bearing grease	Repack
—"—			18	Front wheel bearings	2	—"—	—"—
—"—			19	Rear wheel bearings	2	—"—	—"—
When fueling			20	Engine	1	SAE 40 engine oil	4 % in fuel

[1] Alt. Non-freezing lubricant. See page 61.
[2] Alt. Every 4 month.
[3] Lockheed 33 or equivalent.
[4] First oil change at 2.500—3.000 km (1.500—2.000 miles), with subsequent check every 3.000 km (2.000 miles).
[5] At very low temperature, SAE 80 may be used.

Index

* This operation must be carried out very carefully and should preferably be done by an approved service garage.

1957
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1431

Do not forget

1 TO ADD OIL TO THE GASOLINE
See tables below

2 TO LUBRICATE THE CAR AT REGULAR INTERVALS
See Lubrication Directions, page 61

3 TO CHECK COOLANT LEVEL
See Cooling System, page 33

4 TO CHECK ELECTROLYTE LEVEL IN BATTERY
See Battery, page 44

USE ONLY SAAB ORIGINAL SPARE PARTS

Crank shafts and engines, reconditioned by the factory, are stocked as spares. The replacement system saves time and the prices are so low that extensive repairs as a rule are not profitable.

MIXING TABLES — OIL: GASOLINE

LITRES	
Oil	Gasoline
0,4	10
1,0	25

GALLONS	
Oil	Gasoline
1/8	3 — 4
1/4	6 — 8

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