

SERVICE MANUAL

for

Saab "Granturismo 850"
(Saab 96 Sport)



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TROLLHATTAN, SWEDEN

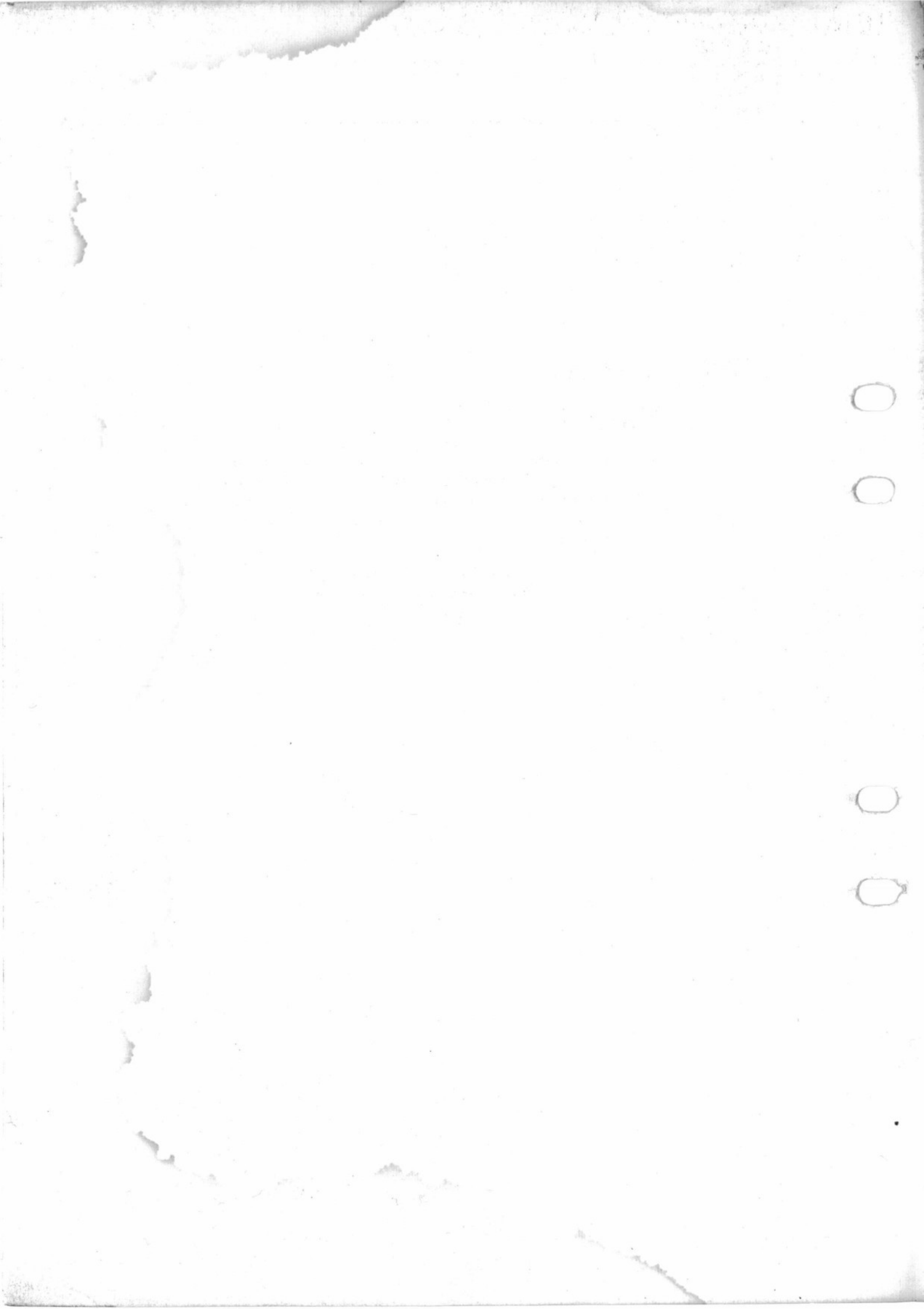
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Foreword

This service handbook covers the Saab "Granturismo 850" (Saab 96 Sport), but only those sections which differ from the Saab 96. It is thus a complement to the handbook for the Saab 96, and is intended to be used in conjunction with it. The division of chapters and layout of both handbooks are identical to facilitate usage.

TROLLHÄTTAN, IN NOVEMBER 1962
SVENSKA AEROPLAN AKTIEBOLAGET
Service Department

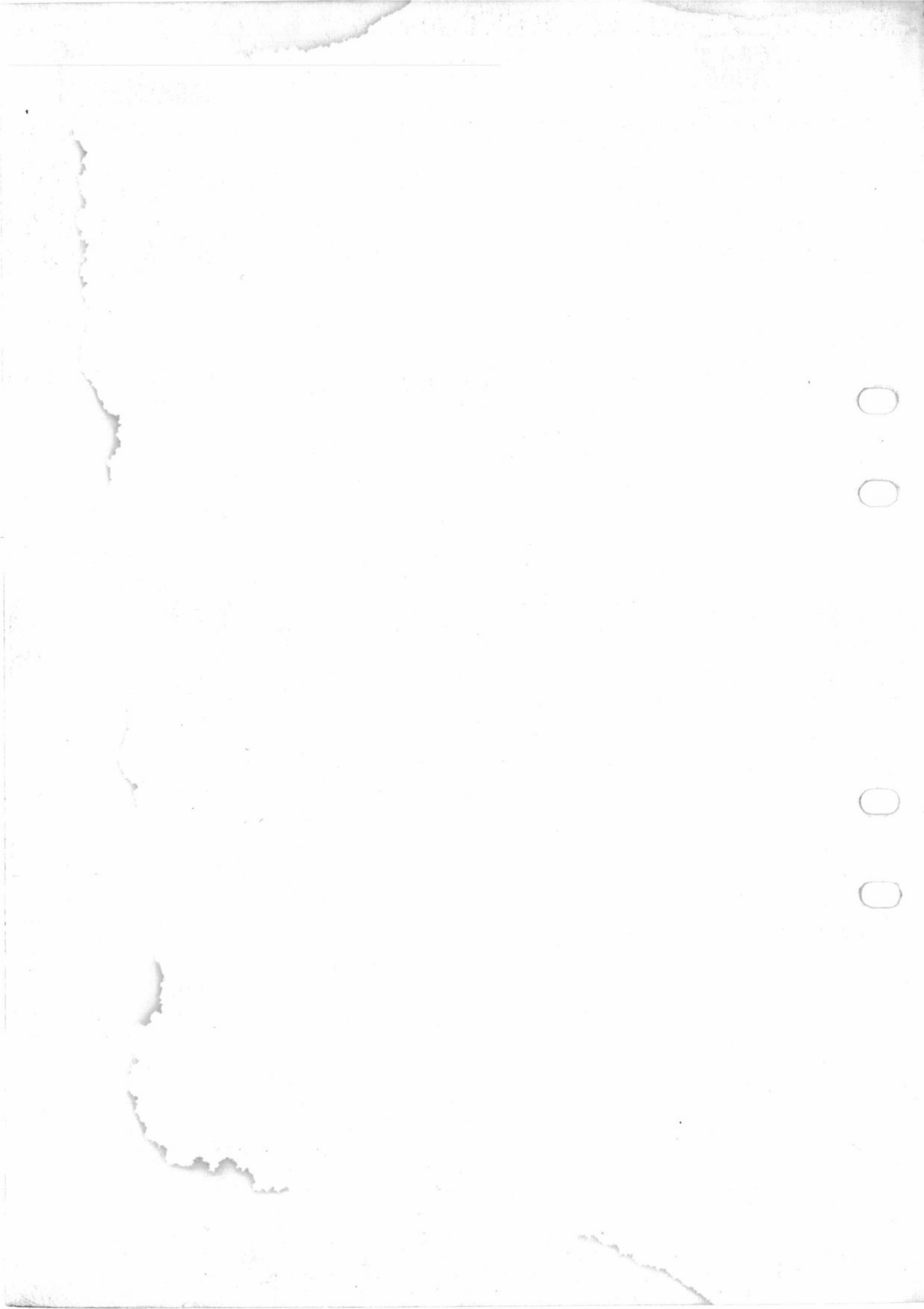




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1. Technical data

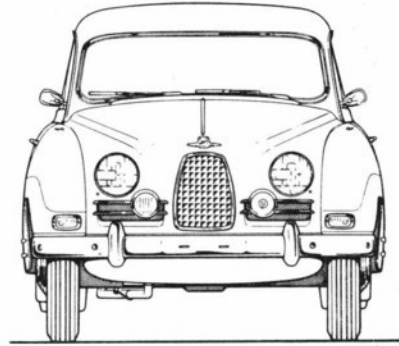
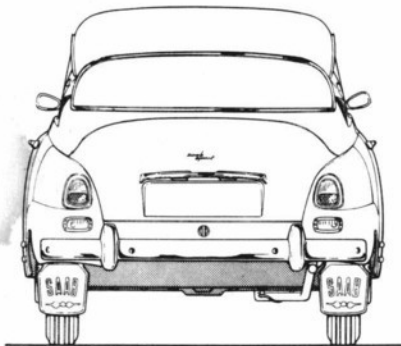
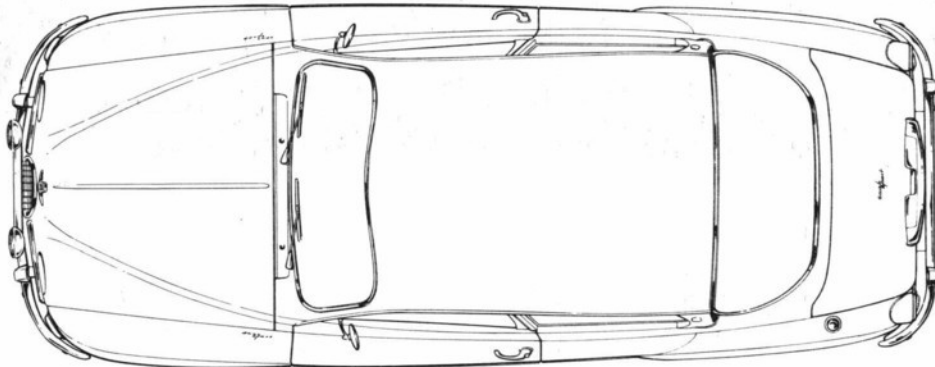
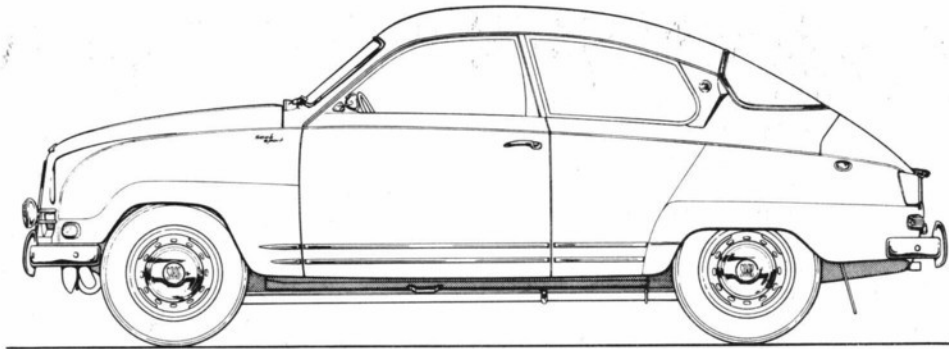
GENERAL

Overall length including bumpers ..	4015 mm (13 ft. 2 in.)
Overall width	1570 mm (5 ft. 2 in.)
Overall height, unloaded	1475 mm (4 ft. 10 in.)
Ground clearance, 2 persons in front seats	140 mm (5.5 in)
Track, front and rear	1220 mm (4 ft.)
Wheelbase	2488 mm (8 ft. 2 in.)
Turning circle	11 m (36 ft)
Dry weight, incl. fuel, water, tools and spare wheel	875 kg (1927 lb)
Curb weight	945 kg (2082 lb)
Gross weight, incl. 4 persons plus baggage	1230 kg (2709 lb)
Weight distribution:	
Dry weight	front 58 %
Gross weight, incl. 4 persons plus baggage	front 50 %
Number of seats	2+2
Trunk:	
Capacity	0.37 cu m (13 cu ft)
Loading area	1000×950 mm (39.4/37.4 in)
Height	460 mm (18.1 in)



2. Description

The Saab "Granturismo 850" (Saab 96 Sport) is a 2+2 seater closed sports car. It differs from the Saab 96 in that it has a 2-stroke engine with a separate lubrication system and is equipped with 3 carburetors. It has a 4-speed gearbox. The front wheels are fitted with disc brakes, the rear wheels have drum brakes. The interior is more comfortable than in the standard model.



Scale views, the Saab "Granturismo 850" (Saab 96 Sport)

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1. Technical data

SPECIFICATIONS

GENERAL DATA

Cylinder volume	841 cc (51.9 cu. in.)
Brake horse power DIN	52 at 5000 rpm
Torque DIN	9.5 kpm at 3500 rpm
Cylinder bore	70 mm (2.76 in.)
Stroke	72.9 mm (2.87 in.)
Compression ratio	9:1
Firing order (1=rear cyl.)	1—2—3

Piston diameter, oversize:

ØD 0.5 A	70.409—70.416
ØD 0.5 B	70.416—70.423
ØD 1.0 A	70.909—70.916
ØD 1.0 B	70.916—70.923

Piston diameter measured at 90° to the piston pin, 15 mm from the lower edge of the piston.

MEASUREMENTS AND TOLERANCES

All measurements in mm.

Cylinder bore, standard:

Class A	69.987—69.994
" AB	69.994—70.001
" B	70.001—70.008
" C	70.036—70.046

Cylinder bore, oversize:

ØD 0.5 A	70.501—70.508
ØD 0.5 B	70.508—70.515
ØD 1.0 A	71.001—71.008
ØD 1.0 B	71.008—71.015

Piston diameter, standard:

Class A	69.895—69.902
" AB	69.902—69.909
" B	69.909—69.916
" C	69.944—69.951

Piston clearance	0.085—0.099
Approx. max. clearance between piston and cylinder through wear	0.15

Out-of-round piston:

Difference parallel and at 90° to the piston pin, measured 15 mm from the lower edge of the piston	0.08—0.10
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Piston ring width:

Upper rings	2.478—2.490
Lower ring	1.978—1.990

Piston ring clearance in groove:

Upper ring	0.08—0.11
Middle ring	0.07—0.10
Lower ring	0.06—0.09

Piston pin diameter	18
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Connecting rod, axial clearance:

Big end	2.05—2.32
Small end	0.1 —0.4

Big end bearing, radial clearance 0.015—0.020

Small end bearing, radial clearance The piston pin should fit with finger-tip pressure. It should be possible to rotate it with two fingers.

Crankshaft, radial play

Max play permissible at the inner bearings with the crankshaft running on the outer bearings 0.05

Compression (new engine)

Measured at an engine temperature of 80° C with fully open throttle and at full starting motor speed 9 ± 0.5 kp/sq. cm. (130 ± 7 lbs. sq.in.)

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TORQUE WRENCH READINGS

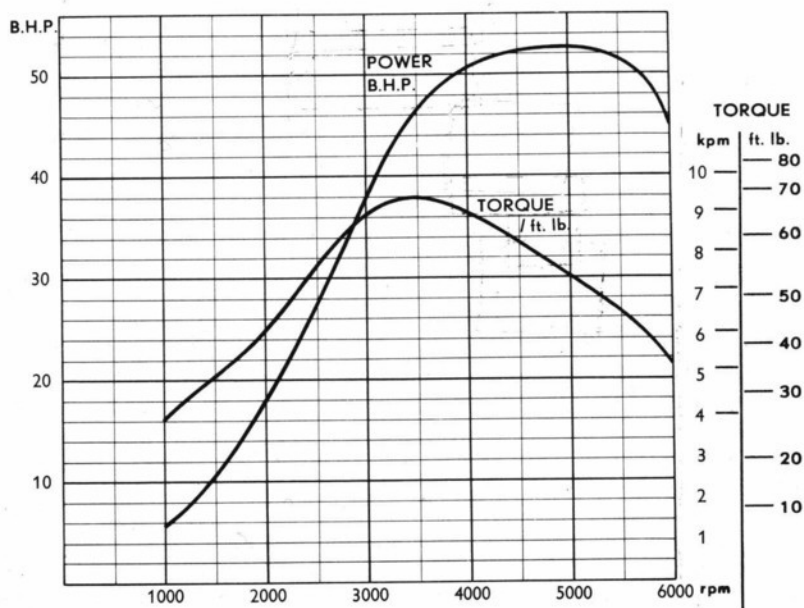
Where used	Screw		Torque reading	
	No.	Size	Kpm.	ft./lbs.
Spark plug	3	M 18	2	14.5
Cylinder head	12	3/8 "	5	36
Crankshaft belt pulley	1	1/2 "	5	36
Flywheel screws	8	5/16 "	3	22
Cylinder block and crankcase	8	5/16 "	2.5	18
	8	3/8 "	4	29

SPECIAL TOOLS

The following special tools are required for removal and dismantling of the power unit. They are largely the same as those required for the Saab 96.

Description	Tool number
For removing front housing	784054
For removing belt pulley	784055
For assembling outer housing	784057
Hoist hook, engine and gearbox	784058
Hoist hook, engine only	784059
Nut for ignition indicator cap	784060
For removing and assembling piston pin	784061
Indicator dial, incl. two spare measuring rods.	784062
Timing cap	784040
Centering tool for clutch disc	784064
Spacer washers for clutch arms	784065
Spacer ring for tool no. 784057	784127
Shaft for oil pump	784128

3 POWER UNIT



Horsepower and torque
Saab "Granturismo 850" (Saab 96 Sport)

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2. Description

GENERAL

The Saab "Granturismo 850" (Saab 96 Sport) has a three cylinder water-cooled two-stroke engine incorporating Schnürle-type crankcase scavenging, piston-regulated port timing, and cylinder scavenging. The engine has a separate lubrication system, the oil from an oil tank being pumped direct to the cylinders and bearings.

The piston displacement is 841 cc (51,3 cu.in.) which is the same as for the Saab 95 och 96. Stroke and bore are also the same as in these models.

The cylinder block and crankcase are cylinder castings; steel pipes cast in the cylinder block feed oil to the three cylinders and four main bearings.

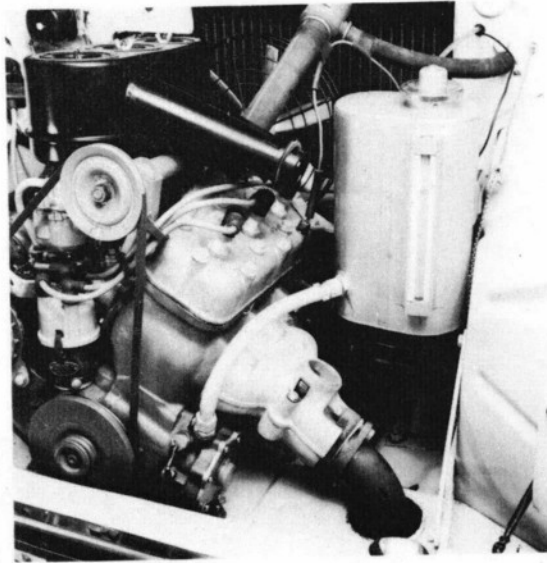
The cylinder head is manufactured of a light metal alloy. The crankshaft is built as a composite unit of considerable strength; it is made up of six crank discs and seven crank pins held together by force fit. This has made it possible to use single ball bearings and double roller bearings for the main bearings and big ends respectively. There are four main bearings. The crank discs are round in order to obtain a higher crankcase compression than

in the Saab 95 and 96. The three crankcase partitions are sealed from one another and from either end by piston-ring type seals, each of which consists of two rings fitted into guides. The rings do not rotate but function in principle as a labyrinth seal.

The connecting rods are drop-forged and hardened. Their machined surfaces function as races for the big and small end bearings. The big end bearing consists of a double row of rollers contained in a cage. The small end has a needle bearing. Axial movement of the connecting rods is controlled from the small end, there being considerable play between the crank discs at the big end.

It is most important that the crankshaft is assembled correctly. For this reason it should only be overhauled by the manufacturer. Only the complete assembly is to be had as a spare.

The all-metal pistons have very thick heads and are fitted with two compression rings and one scraper ring. There are three Solex 34 BIC down draft carburetors connected by an equalizing pipe cast in the inlet manifold.



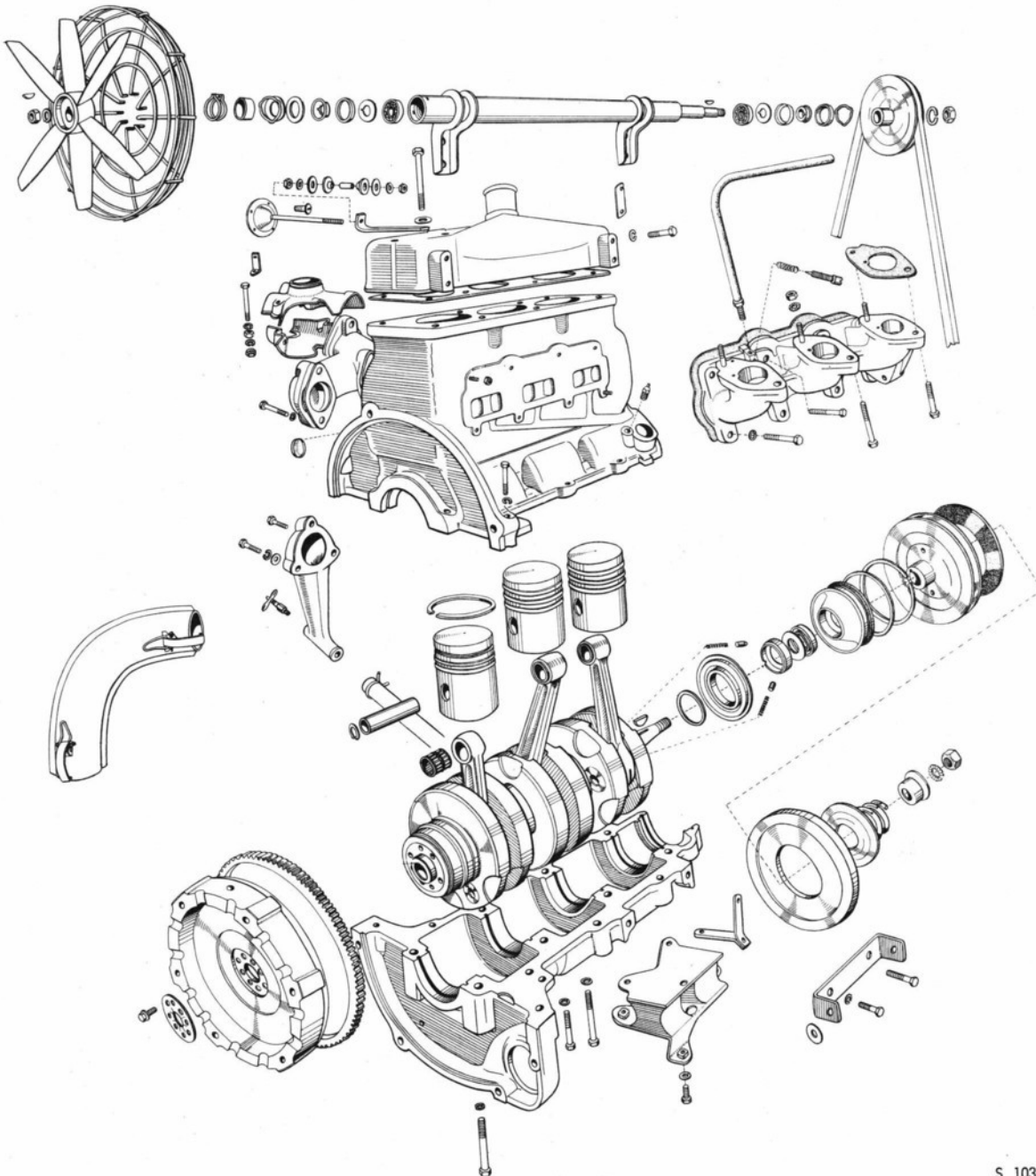
Oil tank and oil pump

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The moving parts of the engine are lubricated with oil from a separate tank, placed to the left of the engine. This tank holds about 3 liters (0,8 US gallons), sufficient for 1500—2000 kilometers (900—1200 miles). A glass gauge on the outside of the tank shows the oil level and a warning lamp on the instrument panel lights up if the supply of oil should fail for any reason. An oil pump, driven of the engine crankshaft, pumps the oil via separate ducts in the engine housing to each of the cylinders and main bearings. From the main bearings the oil is forced on to the big end bearings and also splash lubricates

the cylinder walls. The drive to the oil pump also turns the distributor, its revolutions being reduced by an epicyclic gear in the pump itself. The cylinder and the piston rotate slowly at the same time as the piston expels the oil. During this rotation each oil duct is exposed in turn. The oil pump piston is steered by a cam. The power increase compared to the Saab 95 and 96 has been obtained by changing the port times, increasing the compression ratios in the crankcase and the compression chambers, and by fitting three carburetors and altering the exhaust system.

3 POWER UNIT



The engine, exploded view

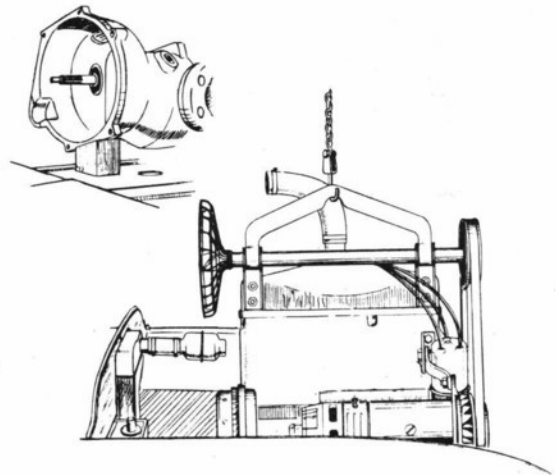
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3. Lifting out and installing

LIFTING OUT THE POWER UNIT

1. Release the ground strap at the power unit and battery.
2. Disconnect the hood by
 - a. Disconnecting the lighting cables, horn cables, shutter chain and stop band.
 - b. Moving the hood backwards and upwards until it slides off the hinge pins.
3. Drain off the coolant.
4. Disconnect the dynamo cables, the high-tension cable, the distributor cap and the ignition cables.
5. Remove the intake silencer with filter and pre-heating unit.
6. Release the fuel hose at the fuel pump and the starter linkage at the carburetor. The rubber boot for the throttle linkage is disconnected from the plate on the throttle spindle.
7. Disconnect the oil pressure sender cable at the oil pump.
8. Disconnect the oil hose at the oil pump connection. Bend up the hose and fasten it in this position so that the oil cannot run out. Cover the connections so that dirt and dust cannot enter the pump or hose.
9. Disconnect and remove the two starter motor fixing screws and place the starter motor on the floor plating. N.B. It is not necessary to disconnect the starter motor cables.
10. Loosen the muffler suspension nuts. See illustration.
11. Loosen the connection between the muffler and the exhaust manifold.
12. Release the clamping to the exhaust pipe and lower the muffler.
13. Loosen the two forward engine anchorages at the body. The six screws are accessible under the floor of the engine housing.
14. Disconnect the clutch cable at the power unit by releasing the tension of the cable and unhooking it at the anchorage under the engine.
15. Loosen the side stays.
16. Unscrew the temperature gauge sender.
17. Disconnect the upper radiator hose at the thermostat.
18. Disconnect the lower hose at the pump.
19. Fit lifting hook 784059. Lift out the engine and block up the gearbox with a 90 mm (3.5 in.) high wooden block or something similar.
20. Separate the engine from the gearbox, and then lift out of the car. Take care that the clutch shaft does not break so that the sealing is damaged.



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Lifting out the engine. Note the block under the gearbox.



INSTALLING THE POWER UNIT

1. Lift the engine into the car. Use lifting hook 784059, see illustration. Make sure that the clutch shaft splines are undamaged and, if necessary, lubricate them with a little graphite grease. Put a little grease (Bosch Ft 1 V13) on the starter gear.
2. Bolt the engine and gearbox together and connect the engine ground strap. Do not forget the anchorage for the clutch cable.
3. Fit the clutch cable.
4. Fit the starter motor.
5. Remove the block under the gearbox and lower the unit.
6. Fasten the forward engine anchorages to the body.
7. Connect the engine side stays, so that the engine sits evenly and is not pulled in any one direction.
8. Fit the muffler by fixing it at the exhaust manifold and muffler anchorage. NB. Do not tighten it finally.
9. Connect the muffler to the exhaust manifold, after which the suspension nut and the clamp for the exhaust pipe are tightened.
10. Fit the temperature gauge sender.
11. Connect the electrical cables to the dynamo and distributor cap and ignition cables.
12. Fit the throttle and start linkages.
13. Connect the radiator hoses.
14. Connect the hose to the fuel pump.
15. Connect the hose to the oil pump, and the electrical cable to the sender.
16. Remove the metal, or plastic, plug which is in the middle of the upper section of the pump, see illustration.
17. Using tool 784128, or a screw driver, turn the pump shaft 100 times. The shaft can only be turned clockwise.

NOTE

When the oil pump, or the engine, has been removed the pump shaft must always be turned about 100 times after the hose from the tank has been connected. This is to fill the pump and lubricating channels with oil.

WARNING

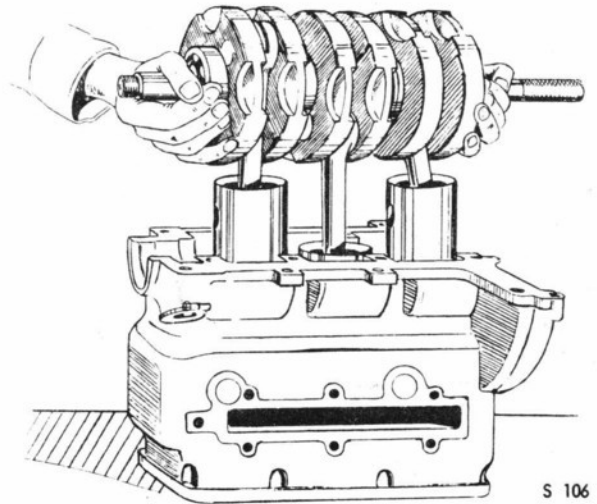
If the pump shaft is allowed to rotate faster than about 60 r.p.m. the pump will be damaged. Electric drills, etc. may absolutely not be used for this purpose.

18. Refit the plug over the pump shaft.
19. Fit the intake silencer with air filter and preheating unit.
20. Put on the hood. Connect the electrical cables, shutter chain and stop band.
21. Fill with coolant.
22. Connect the battery ground strap.
23. Adjust the play of the clutch pedal.
24. Adjust the ignition setting as instructed in Chapter 15.
25. Test the engine.
26. After the engine has cooled retighten the cylinder head if this has been removed.

4. Disassembling and assembling

DISASSEMBLING

1. Clean the outside of the engine.
2. Remove the V-belt, dynamo and water pump.
3. Remove the intake manifold together with the carburetors.
4. Remove the exhaust manifold.
5. Remove the cylinder head bolts and remove the cylinder head and fan bearing bracket.
6. Loosen the clamp screw and take out the distributor.
7. Turn over the engine so that it stands on the cylinder head contact surface. Make sure that the surface it is standing on is clean and does not scratch the sealing surface.
8. Loosen the oil pump fixing screws and remove the pump.
9. Loosen the nut for the crankshaft pulley and remove the vibration damper and pulley. Use puller 784055.
10. Remove the clutch unit. Push in spacer washers 784065 under the clutch levers and loosen the clutch fixing screws. Remove the clutch.
11. Bend up the lock washer and loosen the flywheel anchorage bolts. Remove the flywheel.
12. Remove the engine anchorages under the crankcase half and the lower water pipe from the engine block.
13. Loosen the screws and lift off the lower crankcase half.
14. Take off the distributor gear housing outer cover with seal, O-ring, lock ring and spacers.
15. Remove the distributor gear and fibre washer.
16. Remove, and take care of, the two pins and springs for the dog clutch.
17. Lift out the crankshaft with pistons. Take care that the connecting rods not bent nor the pistons damaged. To facilitate lifting out put clutch centring drift 784064 in the crankshaft bushing and screw tool 784057 on the journal on the other end of the crankshaft, see illustration.
18. Remove the circlips in the pistons and drive out the piston pins with tool 784061. Take care and hold the tool steady so that the connecting rods are not bent nor the pistons damaged.



Lifting out and installing the crankcase.

ASSEMBLY

Inspect and clean all engine parts and replace damaged parts and all gaskets. The cylinder head gasket may not, under any circumstances whatsoever, be refitted. Regarding tightening torques see the table in section 1. Regarding the inspection and overhaul of the engine parts we refer you to the relevant sections, where the working operations are described.

1. Measure the cylinders and pistons to ascertain that the prescribed play is retained. Subsequent classification of new pistons, see section 7.
2. Inspect the needle bearing classifications or classify new needle bearings if the crankshafts or pistons have been replaced. See section 7.
3. Fit the piston rings with the aid of a piston ring plier.

NOTE

The lower piston ring is an oil scraper ring, and is thinner than the others.

4. Fit the pistons to the connecting rods. Tool 784061 is used for this purpose. The guide pin is fitted first to guide the needle bearing. Fit the piston pins and the circlips.

NOTE

The pistons are fitted with the arrow facing forward (towards the ignition end).



5. Make sure that the crankshaft seal ring is fitted in the ignition end. If it has been removed make sure, when fitting, that the "piston rings" are situated with their gaps 180° from each other.
6. Fit the woodruff key in the ignition end of the crankshaft.
7. Fit tool 784057 in the forward end of the crankshaft and push centring drift in the crankshaft bushing. Place the piston ring gap immediately opposite the lock pin on the pistons and put the crankshaft and pistons into the engine block. The centre piston is lowered in first, see the illustration. Oil in the pistons and cylinders before assembly and take care that the piston rings are not damaged.
8. Take off the two tools and fit the two springs and pins for the dog clutch in the ignition end of the crankshaft.
9. Fit the distributor gear, so that the pointed pin is in the gear recess. Oil the parts before assembly.
10. Fit the fibre washer for the distributor gear.
11. Fit the lower crankcase half and tighten the screws successively with the following torques: $\frac{5}{16}$ " screws with 2.5 kpm (17 lbs./ft.) and $\frac{3}{8}$ " screws with 4 kpm (29 lbs./ft.).

NOTE

No sealing agent or gasket may be used in the sealing surfaces between the engine block and the crankcase half. Check that the surfaces are clean and undamaged, and oil with engine oil.

12. Check that the distributor gear is placed correctly, with the pointed pin in the groove, and that the fibre washer is in its place.
13. Fit the outer cover with O-ring and shaft seal. Fit tools 784057 and 784127 on the crankshaft journal and push in the cover by screwing in the tools.
14. Place in the filler washers, in front of the cover, and fit the lock ring. Make sure that the lock ring is completely pressed in the groove.
15. Release the tools between a quarter and half a turn and check that the spacer washers suffice. If this is not the case remove the lock ring and fit in more spacers.
16. Remove the tools when the fitting is satisfactory.
17. Fit the pulley and vibration damper. Do not forget the tab washer under the nut. Tighten the nut to 5 kpm (36 lbs./ft.).
18. Fit the flywheel with a new lock washer, tighten the screws with a hex. box spanner to a torque of 3 kpm (22 lbs./ft.). Lock the screws.

NOTE

Special screws are used for the flywheel.

19. Fit in the clutch disc and fit the clutch. Make sure that the three spacer washers are situated correctly. Centre the clutch disc with drift 784064, while the screws are tightened successively and then remove the spacer washers and drift.

IMPORTANT

There are certain colour markings on the flywheel and clutches for the balancing of the clutch. These shall be turned 180° from each other.

20. Fit the oil pump and gasket.
21. Fit the engine anchorage and lower water pipe. The gasket shall be coated on both sides with sealing agent.
22. Turn over the block and clean the cylinder head and block sealing surfaces.

IMPORTANT

A special cylinder head gasket, "Reinz Super", is used. This **must not** be coated with sealing agent, Permatex or the like.

23. Fit the cylinder head gasket with the wide bevelled pad towards the cylinder head.
24. Fit the cylinder head, with the already attached fan bearing bracket, and tighten the bolts successively. Regarding the tightening sequence and torques see section 5.
25. Fit the intake manifold and carburetors.
26. Pour 50 cm³ (3 cu.in.) engine oil into the distributor gear housing, through the hole in the distributor.

NOTE

50 cm³ (3 cu.in.) engine oil must always be poured into the distributor gear housing when the engine has been disassembled. This level is then held constant by direct lubrication from the oil pump when the engine is running.

27. Fit the distributor. See Chapter 15.
28. Fit the dynamo and connect the lower radiator hose to the pump.
29. Put on the belt and adjust the belt tension.
30. Fit the exhaust manifold and gaskets.

5. Cylinder head

GENERAL

When the cylinder head is to be removed the engine must be allowed to cool before removal commences. Otherwise there is a risk that the cylinder head will become warped. The flatness of the cylinder head shall be adjusted. This is most suitable done on a plane disc with a fine polisher. This type of levelling is usually sufficient and machining should be avoided. If the faults are great the cylinder head should be replaced.

The spark plug threads shall be cleaned out with a thread pin. Carbon deposits in the lower threads can give rise to damaged threads when the plugs are changed. If these are damaged, however, there is the possibility of fitting Helicoil inserts. This also applies to the temperature gauge sender connection and the anchorage bolts for the fan bearing bracket.

REMOVING AND FITTING

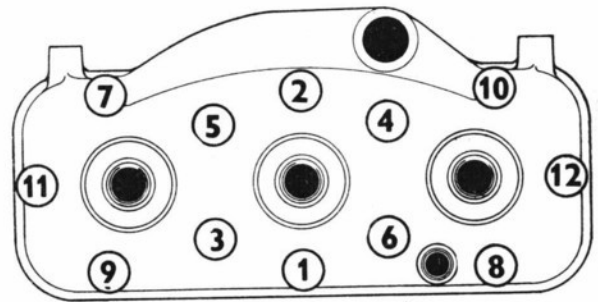
When only the cylinder head is to be removed the procedure is as follows:

1. Drain off the coolant and allow the engine to cool down (below 30° C).
2. Remove the air filter and preheating unit.
3. Loosen the dynamo adjuster and fixing screws and lift off the fan belt.
4. Disconnect the radiator hose from the cylinder head.
5. Disconnect the cables from the spark plugs.
6. Unscrew the temperature gauge sender.
7. Loosen the cylinder head bolts successively and remove the bolts. Bend over the anchorage for the engine side support.
8. Remove the cylinder head and gasket.
9. Dry off any water drops in the cylinder bore and cover the cylinders with a clean cloth.
10. If necessary remove the spark plugs and fan bearing bracket.

Fitting is carried out in the opposite order, and the following shall be especially noted:

The sealing surfaces of the cylinder head and cylinder block shall be cleaned carefully before fitting and the levellness shall be inspected.

If coolant has got into the crankcase, turn the engine over, first manually and then with the starter motor whilst compressed air and thin oil are sprayed through the carburetors. Any coolant will then come up through the overflow channels and the engine parts are simultaneously oiled in. The cylinder head gasket to be used is a special black gasket. Pads are only around the cylinders and the gasket material is reinforced with metal mesh. This gasket **may not** be coated with sealing agent, oil Permatex or the like.



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Tightening sequence for cylinder head bolts

The gasket shall be turned with the wide bevelled pads towards the cylinder head.

See to it that gasket and contact surfaces as well are dry when being fitted.

Center gasket and cylinder head carefully against the engine block.

Before fitting the cylinder head bolts the threads are cleaned with a wire brush and sparingly lubricated with oil or graphite grease. Tightening is then carried out successively, to a torque of 5 kpm, (36 lbs./ft.) in the sequence shown in the illustration. After warming up the engine should be allowed to cool (to about 30° C) before the bolts are retightened. Retightening should be carried out in the same sequence as tightening. Loosen each bolt slightly before retightening to ascertain that the bolt has not stuck in the thread.

IMPORTANT

The cylinder head gasket **must not** be coated with sealing agent.

Tightening torque: 5 kpm (36 lbs./ft.).

The first retightening shall be carried out immediately the engine has cooled after testing.

The second retightening shall be carried out after 1,000—1,500 km (600—900 miles).

The third retightening shall be carried out after 2,500—3,000 km (1,500—1,800 miles).

All retightening shall be carried out with a cold engine (below 30° C).



6. Engine block

GENERAL

The engine block and crankcase are matched as a pair which means that it is not possible to replace the block or the crankcase separately. A crankcase number is stamped on both sides of the separating level at the rear of the right-hand side of the engine.

As well as the engine number, which is stamped immediately under the cylinder head on the right-hand side of the engine, the left-hand side is stamped with the classification the respective cylinders have. See the illustration.

If the cylinder bore is damaged owing to piston seizure, piston ring breakage or excessive wear, the bore must be machined. A cylinder gauge is used to measure the bore. The cylinder bore is normally more worn in the upper section and is therefore tapered and out-of-round. To obtain a comprehensive picture of the cylinder it should be measured in several positions in both the longitudinal and transverse directions of the engine. The degree of wear is obtained by comparing the largest and smallest values.

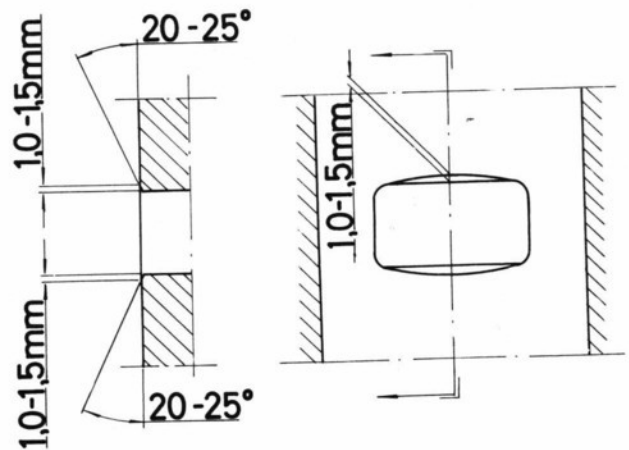
HONING

When replacing pistons, owing to excess noise (excess piston clearance), it is often necessary to hone the cylinder bore. This is partly to remove any unevenness or scratches and partly to suit the clearance to the class of piston to be used. If, on the other hand, the pistons are to be replaced after a relatively short time it is not necessary to hone the bore. In the case of long periods of operation the turning edge must always be removed.

BORING

If the cylinder is to be bored, choose a suitable oversize depended on the extent of the damage. Regarding cylinder classifications see sections 1 and 7.

After boring the ports must always be bevelled according to the illustration, otherwise there will be a risk of piston ring breakage. Bevelling, which shall be greatest in the centre of the port and diminish towards the sides shall be carried out with a rotating file.



Bevelling of ports

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NOTE

When machining a cylinder bore it is imperative that all grindings and the like are removed. This is best done by cleaning the block and crankcase in a degreasing tank.



FITTING THE CRANKCASE

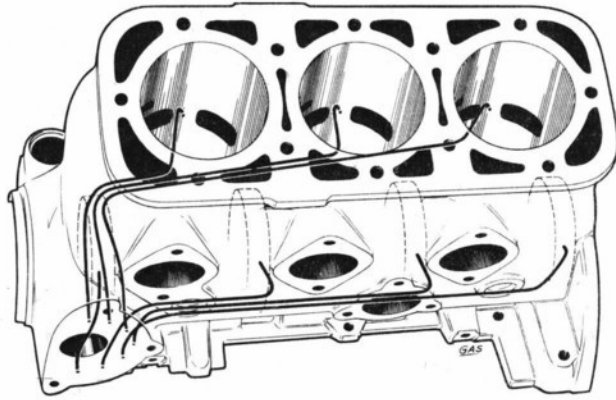
When fitting and removing, the description in section 4 shall be adhered to. As well as this the following should be noted.

When fitting the crankcase to the block the contact surface shall be clean. Gaskets nor any form of sealing may be used whatsoever. The sealing surfaces may only be oiled in. Note that there are two types of bolts and that the tightening torques are different. NB. Do not forget to fit and tighten the bolts at the rear, which are situated on the flywheel side of the block.

INSPECTING THE OIL CHANNELS

Seven steel pipes are cast into the block. These lead the oil from the oil pump out to the main bearings and cylinders.

If it is suspected that there are impurities in the oil channels this can be checked by pushing a 1 mm nylon line (fishing line) through the oil channels. If a channel should be blocked it can be cleaned out with a 0.5 mm piano wire. The oil channels should be specially inspected after the cylinder block has been bored.



Engine block and oil channels

S 117

7. Pistons and piston pin bearings

PISTONS

GENERAL

Pistons for the Saab "Granturismo 850" (Saab 96 Sport) are of the all-metal type, and are equipped with a very thick piston bottom.

The three piston rings are hard-chromed steel rings, the lowest of which is smaller than the other two and serves as an oil scraper ring. This ring is bevelled at the top and has a sharp edge at the bottom.

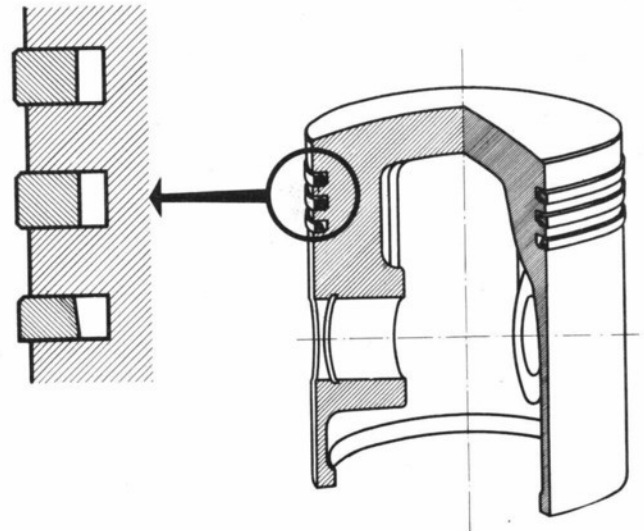
Standard classes for cylinders and pistons	Oversizes and classes for cylinders and pistons
A	∅D 0.5 A
AB	∅D 0.5 B
B	∅D 1.0 A
C	∅D 1.0 B

When fitting pistons the same class shall be used for both pistons and cylinders. The cylinder class is stamped on the exhaust side of the cylinder block and the piston class is stamped on the top of the piston. An engine block can have differing classes on the three cylinders.

When a piston is measured it must be at right-angles with the piston pin and 15 mm from the lower edge of the piston. This is where the piston is largest and it is this value which is given in Technical Data, section 1. The piston is oval ground and tapers both upwards and downwards from this point.

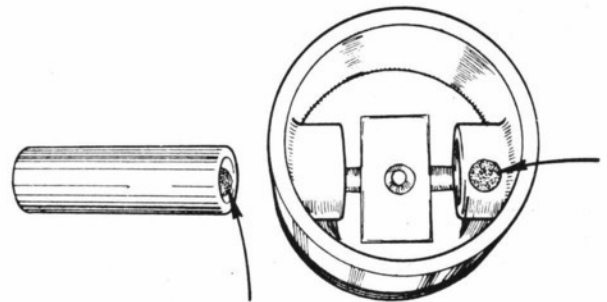
REMOVING AND FITTING

When removing and fitting the description in section 4 must be observed. There are different colour markings in the piston and piston pin respectively, which show the fitting of the pin in the piston. See the illustration. A piston assembly consists of piston, piston pin and piston rings. For example, when replacing pistons make sure that the piston pins are not mixed up but that the pin mated to the piston is fitted. The piston pin is fitted with "light thumb pressure" into the piston.



Piston with piston rings

S 108



Colour markings of piston and piston pin

S 110



The following colour markings can appear:

Red marked piston is fitted with red marked pin. Blue marked piston fitted with blue marked pin. Red marked parts have the largest diameter.

When fitting piston, piston pin and needle bearing to the connecting rod use guide drift 784061. See the illustration. When fitting the piston pin hold the piston firmly in your hand so that the connecting rod is not bent. When fitting the piston make sure that the piston is turned the right way. The reason for this is that the lock pin for the upper piston ring must not be fitted in the vicinity of the warm exhaust port.

NOTE

Fit the piston with the marking F forward, towards the ignition end. Do not forget to fit the circlips.

PISTON PIN BEARINGS

To meet the demands of precise piston pin bearing fitting there is a series of nine bearings. The tolerances and markings of these bearings are shown in the table below. The table also shows the differentiations from the basic diameter, which is 2.000 mm. The bearings marked + are a form of oversize and are normally used on spare parts shafts.

NB. If a bearing has no prefix to its serial number it is a — bearing. See illustration.

Needle group	Marking
+0.008 — +0.006	+7
+0.006 — +0.004	+5
+0.004 — +0.002	+3
+0.002 — 0	+1
+ 0 — -0.002	-1
-0.002 — -0.004	-3
-0.004 — -0.006	-5
-0.006 — -0.008	-7
-0.008 — -0.01	-9

When overhauling a piston pin bearing both the piston pin and needle bearing should be replaced.

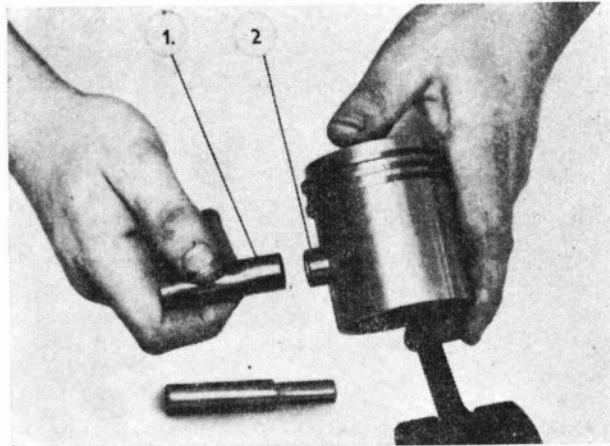
Before fitting a piston the piston pin must be paired with the needle bearing to the correct fitting in the connecting rod. The bearing shall be as nearly as possible free of play, without the piston pin being forced in, when it is fitted in the connecting rod. See the illustration.

WARNING

Light thumb pressure is the maximum permissible fitting of the needle bearing.

NOTE

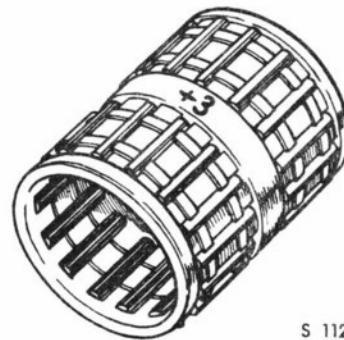
New needle bearings must be classified when pistons or crankshaft are replaced.



Fitting the piston

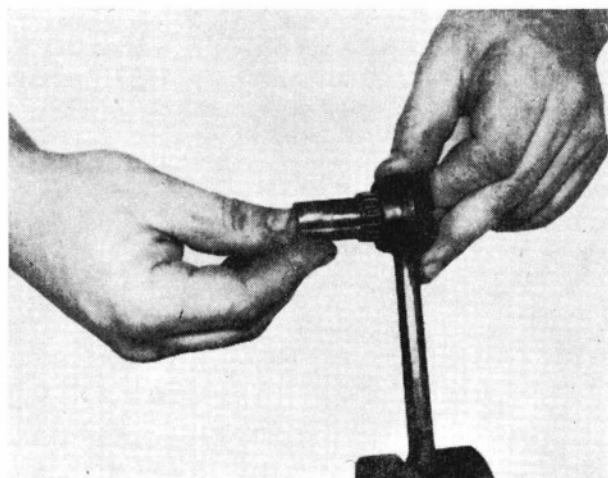
- 1 Piston pin
- 2 Guide pin

S 111



S 112

Marking on needle bearing



Fitting of needle bearing

S 113

8. Crankshaft

GENERAL

The crankshaft is a composite unit, which means that it is impossible to replace its component parts.

The crankshaft is lubricated by the oil being led through oil channels in the block to the groove for the main bearing sealing rings. From there the oil is led through the main bearings, caught up by an oil catcher and led out to the crank pin and big end bearings, see the illustration. The connecting rods are guided axially up in the pistons, which gives a large clearance between the webs.

On a crankshaft, which is not installed, the main bearings have greater play than normal ball bearings. When installed the play is reduced somewhat as the bearing caps are compressed by the engine block and the crankcase half.

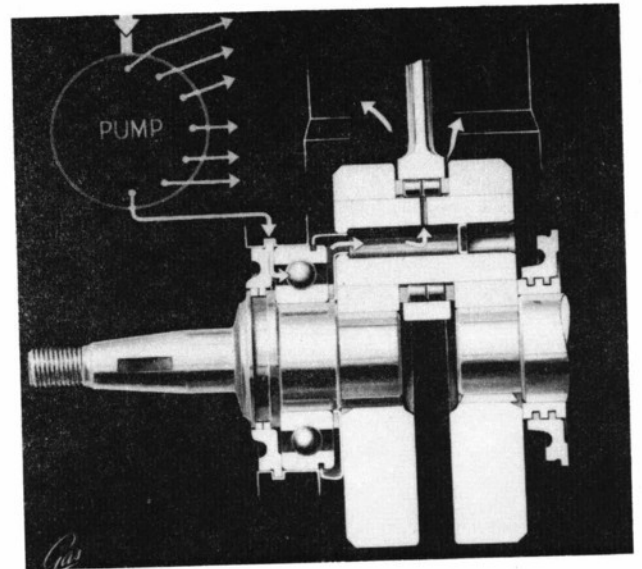
The main and big-end bearings are very susceptible to foreign particles and the crankshaft must thus be well protected when not installed.

NOTE

Always take care, when handling the crankshaft, that the connecting rods are not bent nor the alignment risked.

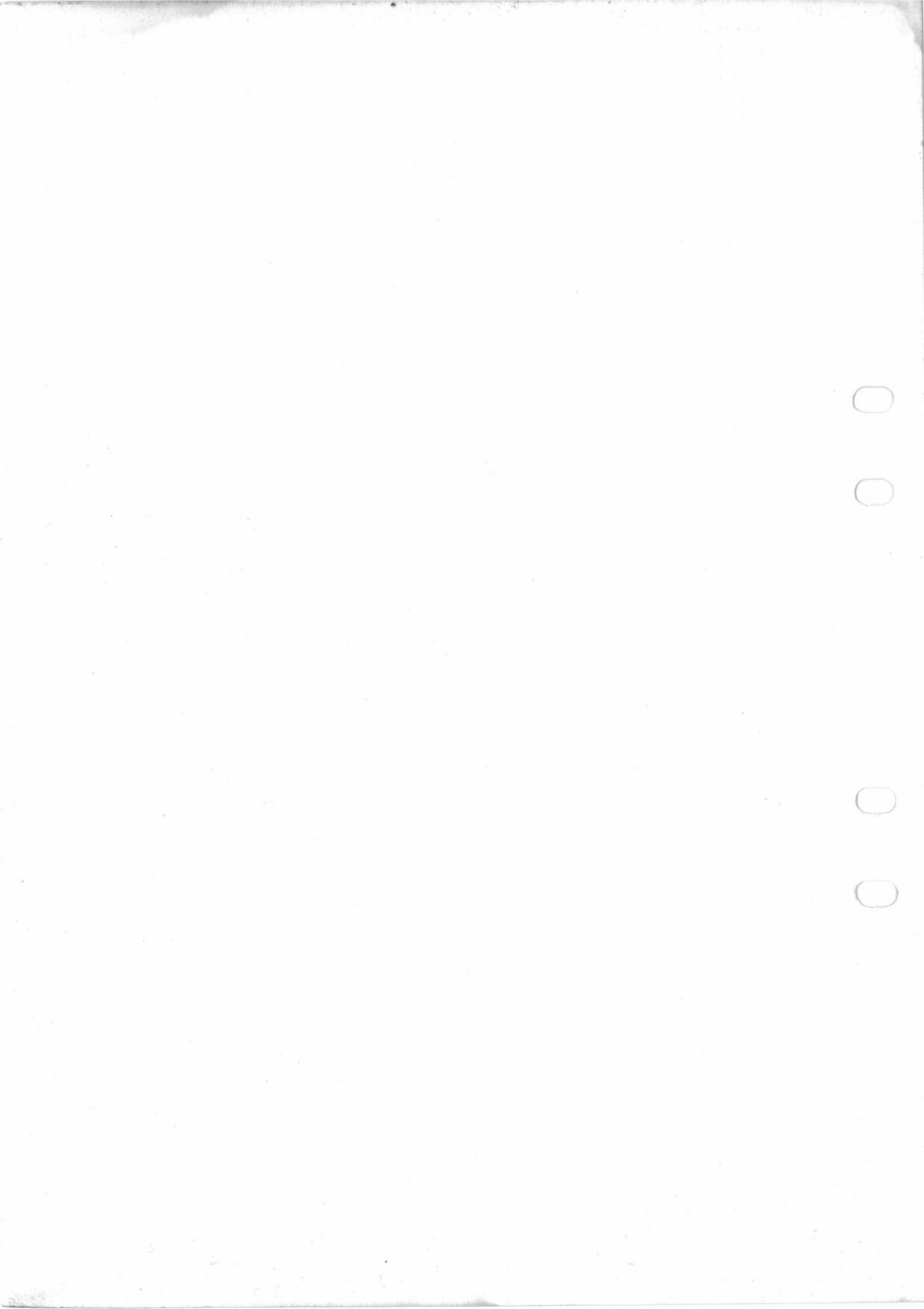
REPLACEMENT OF THE CLUTCH SHAFT BUSHING

If, after cleaning, the bushing shows signs of damage, or has excessive play, it must be replaced. As this play has a great influence on the length of life of the clutch shaft seal, only a play of up to 0.04 mm is permissible. When removing the old bushing it is suitable to use a 16 mm threaded drift and a steel ball. When the threaded drift bottoms against the steel ball the bushing comes out with repeated turning.



Crankshaft lubrication system

S 114



9. Flywheel

REPLACING THE STARTER GEAR

If the starter gear is to be replaced the engine is lifted out of the car and the flywheel screwed off. Note that when the flywheel screws have been removed the rear main bearing is exposed through the screw holes. Care must be taken so that no foreign particles get into the bearing. The old starter gear is removed by drilling a 5 mm hole through it from the back and then splitting it with a chisel. When installing a new starter gear it must be heated to about 200° C. This temperature must be evenly distributed over the whole of the gear and not just in parts.

After heating lay the starter gear on the flywheel with the bevels on the teeth facing upwards. Make sure that the gear lies against the rim all the way round. Avoid hitting the heated gear with a hammer.

GRINDING AND TURNING THE FLYWHEEL

This operation can be necessary if the contact surface for the clutch is worn or scratched. Turning down to 0.5 mm is permissible. In the case of deeper scratches the flywheel should be replaced.

NOTE

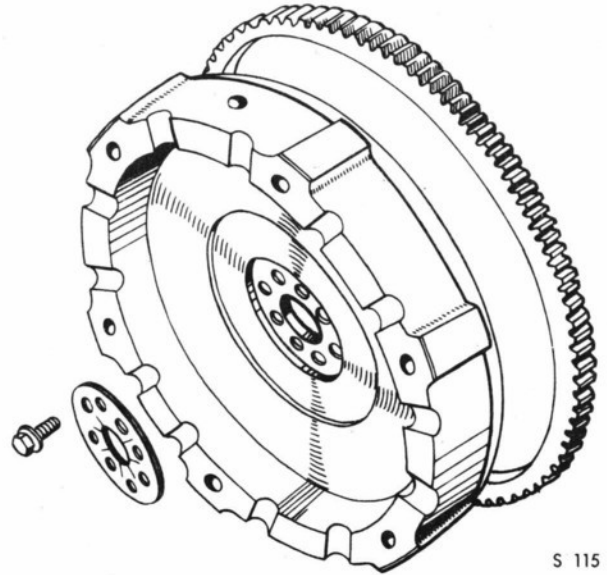
In the case of all machining on the flywheel, in principle an equivalent turning of the clutch plate contact surface must be carried out so not to disturb the relationship between the clutch and the flywheel.

INSTALLING THE FLYWHEEL

It must be noted that the flywheel screws are of a special material and may not be replaced by standard screws.

New lock washers must always be used when installing the flywheel. Do not forget that the bolts must be tightened with a torque spanner [3 kpm (22 lbs/ft.)].

After installation coat the starter gear teeth with grease — Bosch Ft 1 v 13.



S 115

Flywheel and starter gear

0

0

0

0

10. Pump and distributor drive with vibration damper

GENERAL

The distributor gear housing is composed of an extension of the crankcase at the forward end of the engine. It is a completely enclosed area, limited by the crankshaft piston ring seal at the crankcase and a seal ring forward at the pulley. See the illustration.

The distributor drive also drives the oil pump and is equipped with a clutch which comes into operation if the pump should seize or if the oil is too thick.

The clutch consists of two pins, which lie against the inner side of the gear. One of the pins, the lock pin, is pointed and fits in a recess on the gear and locks the gear in relation to the crankshaft. On the outer side of the gear, between the gear and the pulley hub, there is a friction washer against which the gear is pressed by the spring loading of the pins.

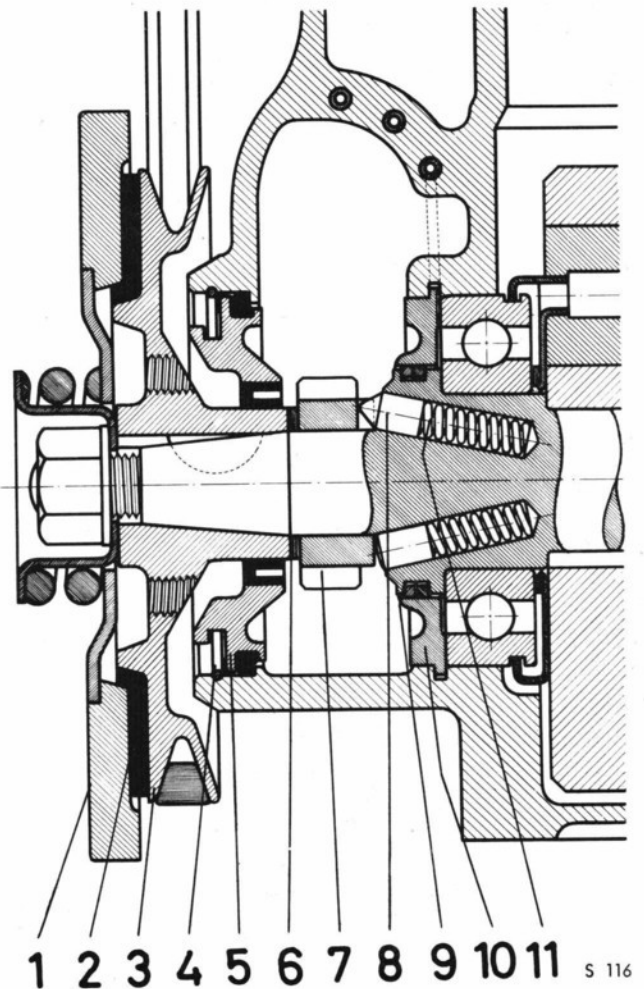
If the pump seizes the lock pin cannot retain the gear and remains stationary (slips) in relation to the crankshaft, whereupon the engine cannot be started. If the pump seizes when driving the engine stalls owing to the fact that the ignition setting becomes faulty.

When the fault has been repaired, turn the crankshaft over manually whilst braking the distributor rotor. The gear re-attains the correct position owing to the fact that there is only one recess for the lock pin.

The distributor is lubricated with oil. When the engine has been disassembled 50 cm³ (3 cu.in.) oil must always be poured into the distributor gear housing so that the correct oil level is attained. The bottom end of the distributor gear should be submerged in oil. When running only a small quantity of oil is allowed to enter, to compensate leakage. The oil is carried through the oil pump shaft bearing.

The pulley is fitted on the tapered pin on the crankshaft and is driven by a woodruff key. There is a rubber disc on the pulley and the vibration damper is pressed against this by a powerful coil spring. The vibration damper can thus move in the rubber and counteract the torsion vibrations of the crankshaft.

The pulley seal ring is fitted in a cap, which also has a seal against the engine block. This is composed of an O-ring. The cap is retained by a lock ring and shims. There are two thicknesses of shims — 0.3 and 0.5 mm. It is imperative that the lock ring lies correctly in its groove and that the right number and sizes of shims are inserted. Too many shims mean that the lock ring can loosen with resultant noise and oil leakage. Insufficient shims can cause oil leakage.



Pump and distributor drive with vibration damper

1. Vibration damper
2. Rubber ring
3. Pulley
4. Lock ring and shims
5. Outer cap and seals
6. Friction washer
7. Distributor gear
8. Lock pin
9. Piston ring seal
10. Inner cap
11. Spring



REMOVING THE DISTRIBUTOR GEAR

1. Disconnect the battery ground strap.
2. Remove the hood by:
 - a. disconnecting the lighting cables, horn cables, shutter chain and stop band.
 - b. moving the hood backwards and upwards until it glides off the hinge pins.
3. Loosening the dynamo and removing the belt.
4. Loosening the nut for the crankshaft pulley and removing the vibration damper and pulley. Use puller 784055 for the pulley.
5. Loosen the distributor clamping screw and pull up the distributor. The oil pump need not be removed.
6. Remove the lock ring and shims for the distributor gear housing cap.
7. Remove the cap, if necessary with the aid of puller 784054.
8. Remove the friction washer, distributor gear, lock pins and springs.

INSTALLING THE DISTRIBUTOR GEAR

1. Fit the lock pins and springs.
2. Fit the distributor gear with the recess for the lock turned inwards. **Turn the gear so that the lock pin enters the recess.**

NOTE

The distributor gear must turn easily on the shaft. Oil the gear before fitting.

3. Fit the friction washer and the woodruff key.
4. Fit the outer cap with the seal ring and O-ring.
5. Push in the cap by screwing tools 784050 and 784127 onto the shaft pin.
6. Place a suitable number of shims between the lock ring groove and cap.
7. Fit the lock ring. Make sure that it goes into the groove.
8. Release the tool between a quarter and half a turn and make sure that the shims lie properly against the lock ring. Otherwise the lock ring must be removed and the combination of shims altered.
9. Remove the tool from the shaft.
10. Press on the pulley.
11. Fit the vibration damper. Do not forget the lock washer under the nut. Tightening torque: 5 kpm (36 lbs./ft.).
12. Pour 50 cm³ (3 cu.in.) oil into the distributor housing.

NOTE

When the distributor gear housing has been disassembled 50 cm³ (3 cu.in.) of engine oil must always be poured in before the distributor is fitted.

13. Fit the distributor. See Chapter 15 regarding the ignition settings.
14. Fit the drive belt and tension the dynamo.
15. Fit on the hood and stop band. Connect the lighting cables, horn cables and shutter chain.
16. Connect the battery ground strap.
17. Make sure that the lights and horn function properly.
18. Test.

11. Oil pump

GENERAL

The oil pump is driven by the distributor gear on the crankshaft. The speed is substantially reduced by a planetary gear situated in the pump housing. When the pump is operating the pump cylinder and plunger rotate slowly at the same time as the plunger reciprocates in the cylinder. The plunger obtains its movement from a tappet. As the cylinder rotates the oil channels are exposed in turn thus feeding the seven lubricating points.

The oil channels in the engine block and pump meet at the contact surface between the block and pump and sealing is accomplished with a gasket.

Over and above the seven points in the engine block the distributor gear is also lubricated, by the oil which has first lubricated the planetary gear and the pump shaft.

To indicate the oil pressure there is a sender in the pump. This sender, which is mainly composed of a spring-loaded piston influenced by the oil pressure, is connected to a warning lamp on the dashboard through the medium of cables and a relay. When the engine is still or if the oil pressure falls below a certain minimum value the line from the pump to the relay is grounded continually and the warning lamp lights up. The lamp never lights up when oil pressure is normal.

There are two makes of oil pump but their operation is principally equal. The oil pumps are sealed and the seals may not be broken. If a pump is damaged it must be completely replaced. There is an exchange system for this component, provided that the seal is unbroken. The only permissible repair operations in conjunction with the pump is the replacement of the contact unit for the oil pressure sender and the replacement of the pump gear.

REPLACING THE OIL PUMP OR PUMP GEAR

REMOVAL

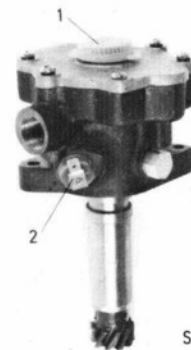
1. Disconnect the battery ground strap.
2. Remove the hood by:
 - a. disconnecting the lighting cables, horn cables and shutter chain and stop band.
 - b. moving the hood backwards and upwards until it glides off the hinge pins.
3. Disconnect the nipple for the oil hose at the pump and fasten up the hose at the oil reservoir so that the oil does not run out of the reservoir. Cover the connections so that no dirt can get in.
4. Disconnect the cable connection at the sender.
5. Unscrew the three pump fixing screws.
6. Pull out the pump.
7. If the pump drive shall be replaced:

File off and drive out the pin for the pump gear, take care that neither the pump nor the pump shaft are damaged. Protect the oil channels on the flange from dirt and filings.
8. Pull off the gear.



Oil reservoir and pump S 118

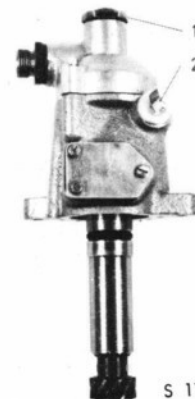
1. Oil reservoir
2. Oil hose
3. Plug for pump shaft
4. Oil pump (SAAB)
5. Oil pressure sender



S 120

SAAB oil pump

1. Plug for pump shaft
2. Oil pressure sender



S 119

ÅSSA oil pump

1. Plug for pump shaft
2. Oil pressure sender

3 POWER UNIT



FITTING

1. Fit the gear onto the shaft. Adjust the axial play to 0.1—0.2 mm before finally driving in the pin. When riveting the pin care must be taken not to damage the shaft or the pump. The rivet head may not exceed a height of 0.5 mm.
2. Fit the pump and screw it onto the block, use a new flange gasket.
3. Connect the oil hose and the cable to the sender.
4. Remove the metal or plastic plug in the centre of the upper section of the oil pump. See the illustration.
5. Rotate the pump shaft 100 times with the aid of tool 784128 or a screwdriver. The shaft can only be turned one way as it is locked in the other.

NOTE

When the oil pump or engine has been removed the oil pump shaft must always be turned over 100 times after the hose from the oil reservoir has been connected.

WARNING

If the pump shaft is allowed to rotate faster than 60 r.p.m. the pump will be damaged. Electric drills, etc., may absolutely not be used for this purpose.

6. Refit the plug over the pump shaft.
7. Fit the hood and stop band and reconnect the lighting cables, horn cables and shutter chain.
8. Connect the battery ground strap.
9. Make sure that the lights and horn function properly.
10. Test.

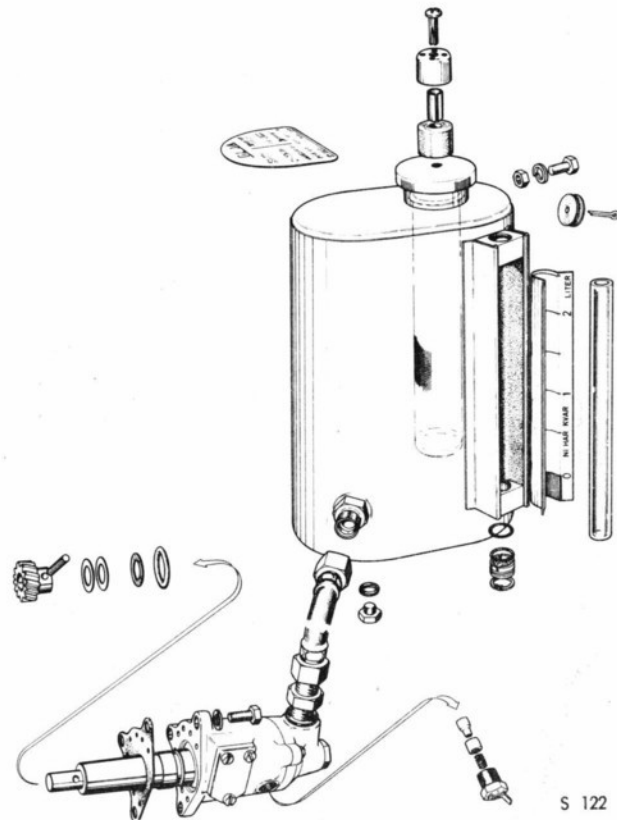
NOTE

If the engine has been removed and during removal the oil pump has come into a position where the oil has run out of the distributor gear housing, 50 cm³ (3 cu.in.) new oil must be poured in before the pump or distributor are fitted.

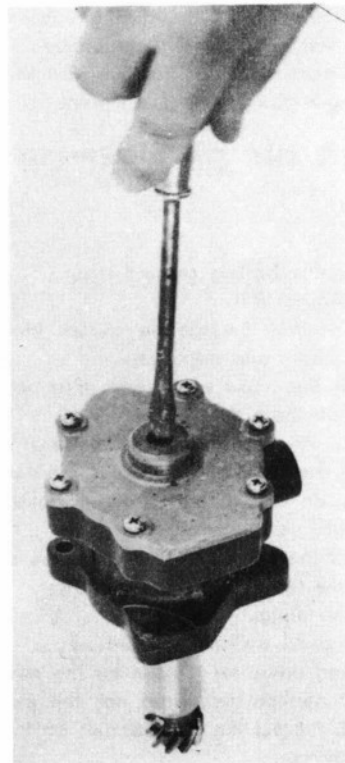
OIL PRESSURE SENDER

GENERAL

The pump oil pressure sender shall ignite a warning lamp on the dashboard if the oil pressure is insufficient or zero. The impulse goes to the warning lamp via a relay. Wiring diagram, see Chapter 15.



Oil reservoir and pump (ÅSSA)



Filling the oil channels by turning the pump shaft.

DISASSEMBLING AND ASSEMBLING THE OIL PRESSURE SENDER

1. Pull off the cable to the sender and unscrew the upper section of the contact unit. Look after the gasket.
2. Remove the spring, contact sleeve and piston, see the illustration. Pull out the piston carefully with a plier.
3. When fitting make sure that the piston slides easily in the cylinder.

NOTE

The fitting of the plunger in the cylinder is very precise. For this reason great care must be taken so that no dirt gets in when removing and fitting. The piston and cylinder are matched. This means that the piston cannot be replaced as a single unit.

INSPECTING THE OIL PRESSURE SENDER.

If the warning lamp on the dashboard ignites or if the lamp does not go out within 1½ minutes of starting the car, stop the engine immediately and investigate the following.

1. Make sure that there is oil in the reservoir.
2. See that the cable between the relay and the sender is not broken or that it is not short-circuited and in contact with the casting.
3. Inspect the sender as follows:
 - a. Disconnect the cable to the sender.
 - b. Connect a testing lamp between the positive terminal on the battery and the sender.

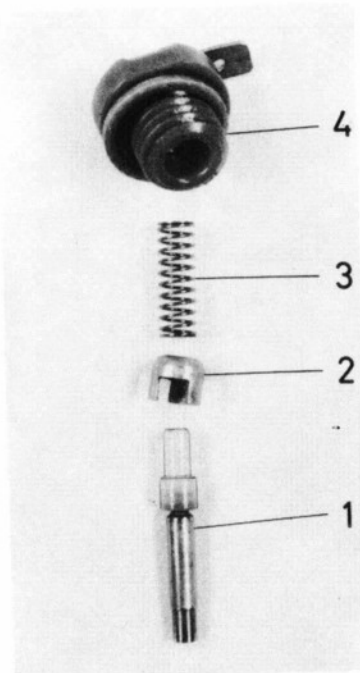
IMPORTANT

The sender can be damaged if a lamp with a higher wattage than 5 W is used.

- c. Remove the metal or plastic plug on the centre of the upper section of the pump.
- d. Rotate the pump shaft with a screw driver or tool 784128. If the lamp **flashes in synchronization** with the revolutions the sender is functioning and oil is being fed. The fault probably lies in the relay.
- e. If the testing lamp **does not flash** but stays alight continually, or does not light up at all, the sender must be removed and examined. It is possible that the piston sticks in the cylinder or that the contact sleeve has stuck.

CHECKING THE OIL FEED

1. Check the oil level in the reservoir.
2. Then check the oil feed by seeing whether the oil comes through the holes at the anchorage flange. The pump shaft shall be rotated through the hole in the upper section of the pump. If the pump gear is rotated instead the oil will take much longer to come out owing to the greater ratio. If the oil feed is not functioning despite that the shaft is turned the pump must be replaced.



Oil pressure sender S 121

1. Piston
2. Contact sleeve
3. Spring
4. Nipple

INSPECTING THE PUMP GEAR

If the oil pump seizes or if a thick oil is used in intense cold the distributor gear slips on the crankshaft. The ignition timing then becomes faulty and the engines stops. See section 10.

If the fault is that the oil is too thick take the car into a warm garage and change the oil to that of the correct viscosity. When the oil pump has attained room temperature the distributor gear should retain the correct position when starting. If it does not do this remove the distributor cap and turn the crankshaft over manually whilst braking the distributor rotor lightly by hand. The clutch lock pin then attains the correct position in the recess in the gear. With continued rotation of the crankshaft (clockwise seen from the front) the distributor rotor should also rotate. If the distributor arm remains stationary the pump has probably seized. This is investigated by removing the pump and seeing whether the pump shaft turns easily.

CHECKING THE OIL WARNING SYSTEM

Regarding the checking of the oil warning system, relay with warning lamp, see Chapter 15, section 5.





Contents

Section

- 1 TECHNICAL DATA
- 2 DESCRIPTION





1. Technical data

SPECIFICATIONS

Oil capacity 1.4 litres (1.5 US qts.)
Lubricant EP oil, SAE 80

Ratio, total:

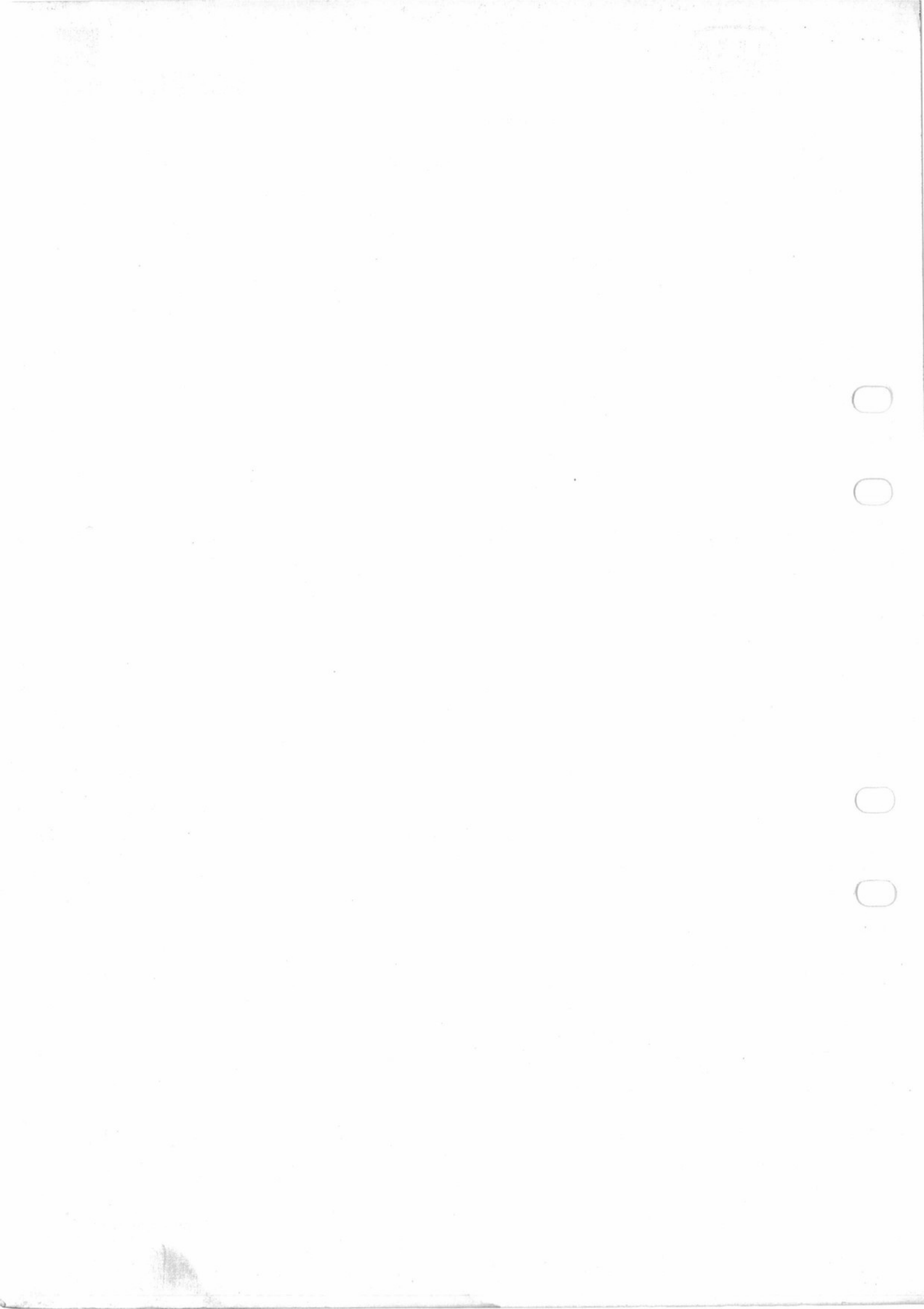
1st speed 18.3:1
2nd speed 10.8:1
3rd speed 6.6:1
4th speed 4.3:1
Reverse 16.7:1
Pinion/crown wheel 5.1:1
Number of teeth, pinion/crown wheel .. 7:36

Speed at 1000 engine r.p.m.

1st speed 6.1 km.p.h. (3.8 mph)
2nd speed 10.4 km.p.h. (6.5 mph)
3rd speed 17.1 km.p.h. (10.6 mph)
4th speed 26.1 km.p.h. (16.2 mph)
Reverse 6.7 km.p.h. (4.2 mph)

2. Description

Saab "Granturismo 850" (Saab 96 Sport) is equipped with a four-speed gearbox. This tallies with the gearbox in the Saab 95 and GT 750 with the exception of the ratios.





Contents

Section

- 1 TECHNICAL DATA
- 2 DESCRIPTION
- 3 FUEL PUMP
- 4 CARBURETORS WITH INLET MANIFOLD
- 5 AIR FILTER



1. Technical data

SPECIFICATIONS

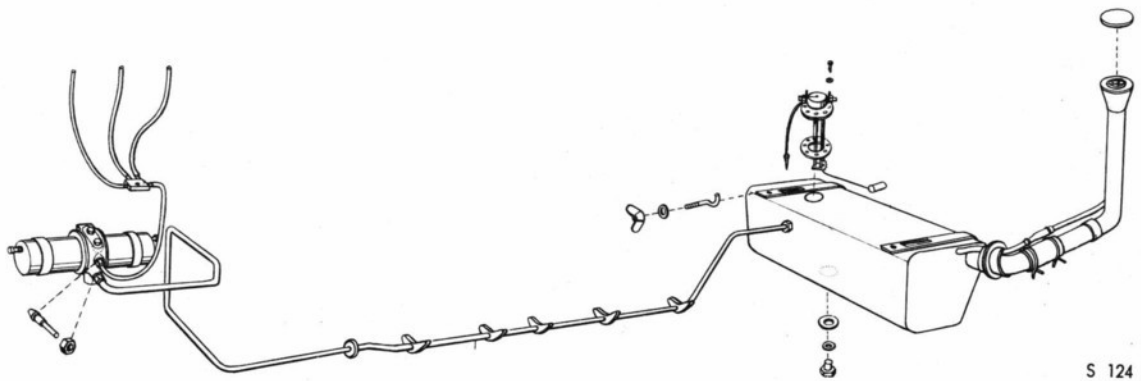
Fuel tank capacity	Approx. 40 litres (10.5 US gal.)
Fuel pump	SU type AUA 48 Bendix
Breaker point clearance	Approx. 0.75 mm
Pump capacity with free outlet at pump	75 litres per hour (20 gph.) 65—72 litres per hour (17—19 gph.)
Pressure height above pump at 25 litres per hour (= 1 litre in 2½ mins.)	650—1000 mm (26—40 in.) 950—1350 mm (38—54 in.)
Pressure height above pump at zero capacity	650—1200 mm 26—48 in.) 1550—1950 mm (62—78 in.)
Carburetors	Solex 34 BIC
Normal settings:	
Main system:	
Choke tube	28
Main jet	115
Correction jet	150
Emulsion tube	21
Idling system:	
Air jet	120
Fuel jet	55—60
Cold starting system:	
Air jet	3.5
Fuel jet	160
Float valve, SU fuel pump	1.7
Float valve, Bendix fuel pump	1.5
Float weight	5.7 grammes
Float level	20±1 mm (0.78 in.±0.04)



2. Description

GENERAL

The fuel system consists of the tank, the fuel lines, the pump, the fuel hoses, the carburetors and the air filters. The fuel tank and lines are in general the same as for the Saab 96.



S 124

Fuel tank with lines and pump.

6 FUEL SYSTEM



CARBURETORS

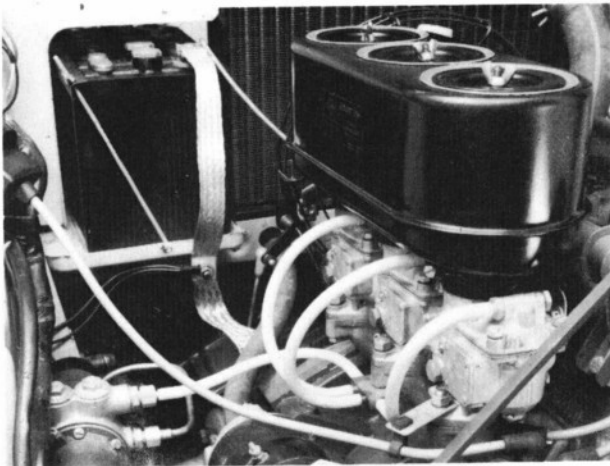
Three Solex 34 BIC down-draft carburetors are fitted to a common inlet manifold, which has a channel to each cylinder. There is a thin union channel cast into the manifold between these channels. This channel has the task of balancing the carburetors.

On the inlet manifold there is a volume screw for the air to the idling system. Air comes from the air cleaner through a hose to the inlet manifold, where the volume of air can be regulated by the volume screw. The air is then distributed into special channels up to each of the carburetor idling systems. On the carburetors are also volume screws,

for the fuel-air mixture. These screws are locked with stop nuts and may not be altered, as they have been set at the factory with the aid of a flow gauge.

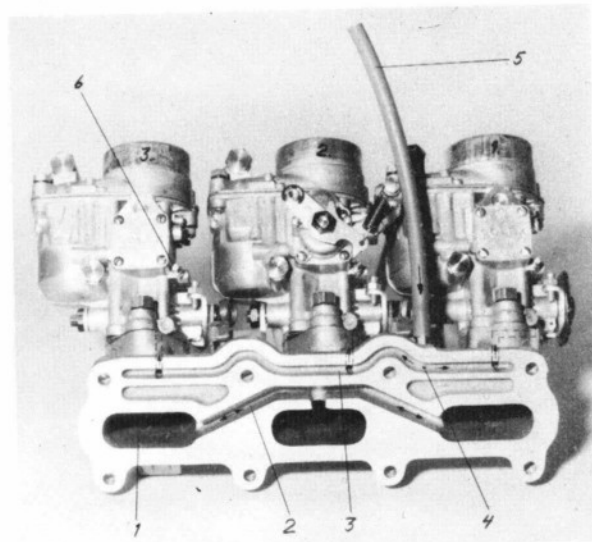
The center carburetor is furnished with a cold start unit, a bistarter; the other two carburetors have no such unit. The fuel-air mixture is distributed to the other cylinders through the balancing channel in the inlet manifold.

The carburetors have an air filter with three replaceable paper inserts. A detachable preheater tube is fitted between the air cleaner and the exhaust manifold.



Carburetors and air filter

S 125



Carburetors and inlet manifold

S 126

1. Channel to cylinder
 2. Balancing channel
 3. Distribution channel for air to idling system
 4. Volume screw for air
 5. Air hose to volume screw
 6. Volume screw for fuel-air mixture
- NB May not be moved

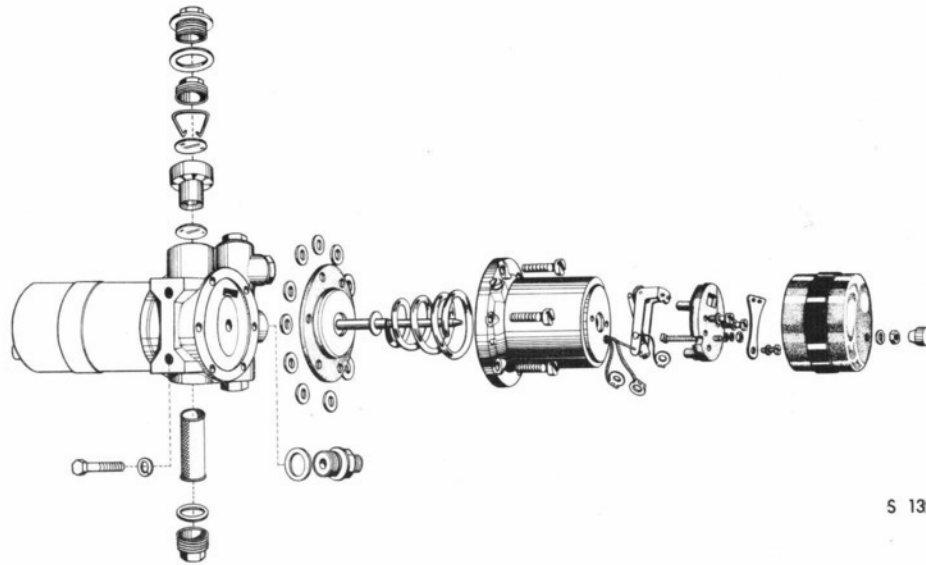


3. Fuel pump

GENERAL, SU FUEL PUMP

The SU fuel pump is an electric double-action pump. It has two independent pump units fitted in a common valve housing. The parts included in the pump unit, such as the solenoid housing, diaphragm, pump spring,

breaker mechanism, etc. are the same as in the fuel pump used in the Saab 95 and 96. The method of replacing the breaker points and renovating the pump, etc. are the same described in the service manual for the Saab 96.



S 132

SU double-action fuel pump

GENERAL, BENDIX FUEL PUMP

With effect from chassis number 168001 the Saab "Gran Turismo 850" (Saab Sport) is equipped with a Bendix fuel pump.

The Bendix fuel pump consists of a unit containing a solenoid section, a breaker unit, a pump plunger, valves and a filter. The solenoid section encompasses the plunger, at the lower end of which the outlet valve is situated. The inlet valve is fitted in a special valve housing under the plunger, and is attached to the solenoid housing by three screws. The pump plunger spring rests against the lower section of the valve housing. In the upper end of the pump plunger there is a spring which dampens the plunger movement in the upper position. The pump is equipped with a filter, as well as a magnetic plug for the collection of particles. The filter and magnetic plug are accessible when the bayonet-socketed cap has been taken off.

The breaker unit operates in a hermetically sealed, gas-filled housing which is situated in the upper section of the pump housing. Closing and breaking work magnetically under the influence of the pump plunger.

When the pump plunger is in the upper position the breaker unit is closed and if the ignition is turned on the solenoid coil becomes conductive, whereupon the power attracts the plunger and pulls it downwards, and compresses the plunger spring.

When the plunger moves downwards the fuel is transferred from the underside to the overside of the plunger through the outlet valve. Immediately before the plunger reaches the lowest position the circuit to the solenoid coil is broken, whereupon the plunger spring pushes the plunger back and the fuel above the plunger is forced through the outlet connection to the carburetors. New fuel is transferred through the inlet valve to the underside of the plunger simultaneously. When the plunger reaches the upper position the cycle is repeated.

NOTE

The pump can only work in one position i.e. with the bayonet cap downwards.

6 FUEL SYSTEM



IMPORTANT

The Bendix pump gives higher pressure than the SU pump. For this reason the needle valves must always suit the pump, as follows:

Pump	SU	Bendix
Needle valve	1.7 mm	1.5 mm

CLEANING AND ADJUSTING

Remove the bayonet cap at the lower end of the pump. Remove the filter and clean it. Wash the cap and gasket in white spirit, and see that the magnetic plug is cleaned of particles.

The breaker mechanism is not accessible for adjusting. If there is any fault in this unit or the solenoid section, the pump housing must be replaced.

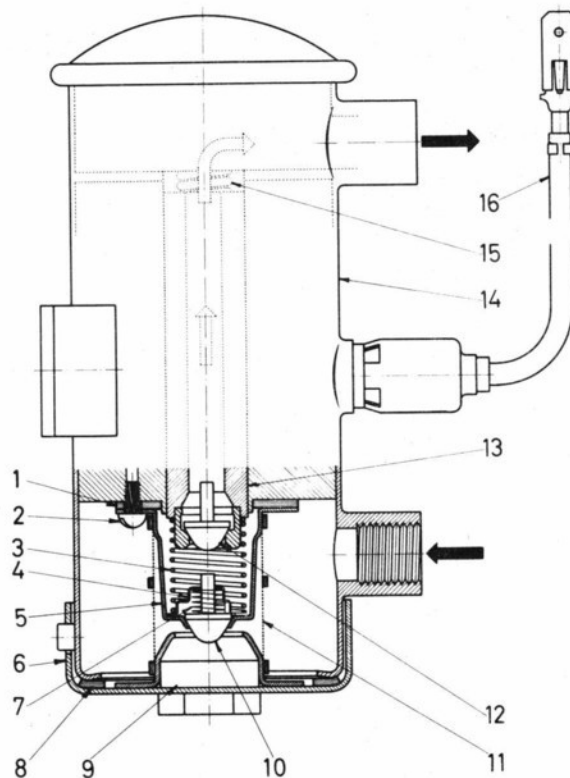
DISASSEMBLY

1. Take off the bayonet cap and remove the gasket and filter.
2. Loosen the three screws which retain the valve housing and remove it. Take care of the gasket.
3. Remove the inlet valve with retainer and spring from the valve housing.
4. Pull out the piston and spring from the pump housing, and inspect the filter inside the plunger.

ASSEMBLY

When the parts have been washed and blown clean, and the plunger and valves have been examined regarding wear and sealing properties any defective parts must be replaced and the pump assembled as follows:

1. Oil in the plunger sparingly with thin oil, install the plunger spring and push the plunger into the barrel.
2. Fit the inlet valve with spring and retainer into the valve housing.
3. Install the valve housing with gasket and screws into the pump housing and tighten the screws.
4. Put the filter onto the valve housing and fit the bayonet cap and gasket.
5. Test the pump regarding pressure and capacity by connecting it to a testing unit.



Bendix fuel pump

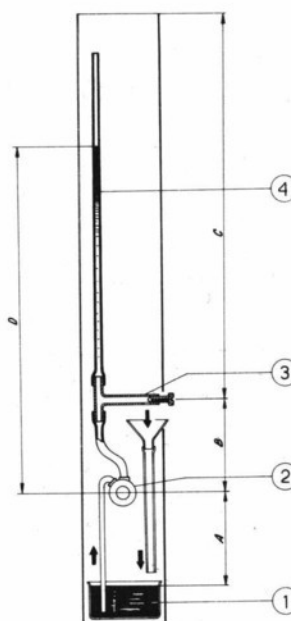
S 220

1. Gasket
2. Screw
3. Plunger spring
4. Spring retainer
5. Valve housing
6. Bayonet cap
7. Valve spring
8. Gasket
9. Magnetic plug
10. Valve
11. Filter
12. Valve
13. Plunger
14. Pump housing
15. Damping spring
16. Electrical connection

INSPECTING THE FUEL PUMP

After breaker points have been replaced or if the fuel pump has been renovated it is advisable to check the pressure height and capacity. This can be done with a simple device, as shown in the illustration. Place a container, with a capacity of about 2 litres (2.1 US qts.), on a plank and above this a holder for the fuel pump. Place a perpendicular pipe, composed of a transparent plastic hose, above the pump. Fit a T-union to the top of the pipe with an adjustable needle valve and a free outlet. A funnel and a return line are fitted under the outlet. The values in the illustration compare with the distances in the car between the tank, pump and carburetors.

When using the device pour white spirit into the container and connect the pump to a battery. Adjust the needle valve to the capacity given in Technical data, with the aid of a litre measure and a clock. The pressure height can then be inspected whilst the pump is operating. The zero capacity pressure height can be checked when the outlet is blocked with a finger.



S 137

Testing device for fuel pump

- | | |
|----------------------------|-----------------------|
| 1. Container | A = 250 mm (10 in.) |
| 2. Fuel pump | B = 250 mm (10 in.) |
| 3. Adjustable needle valve | C = 2,000 mm (80 in.) |
| 4. Pipe | D = Pressure height |

11

0

0

0

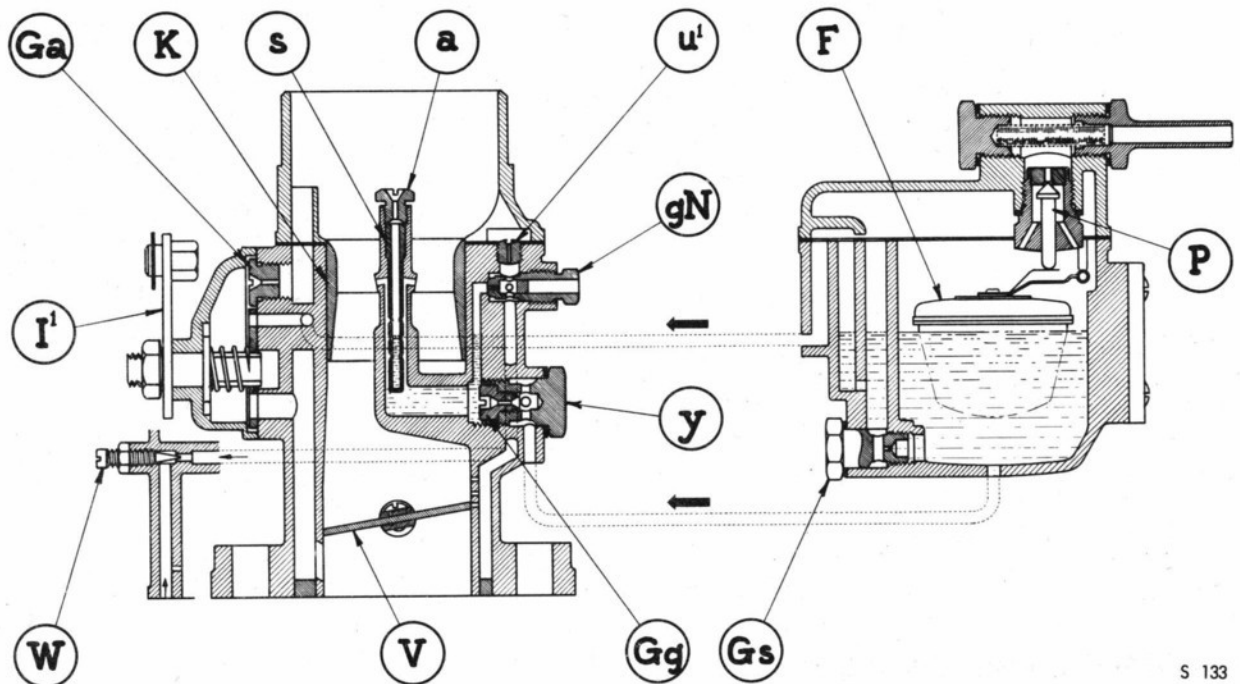
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4. Carburetors and inlet manifold

GENERAL

The three down-draft carburetors are Solex 34 BIC carburetors and are fitted to a common inlet manifold, with an inlet to each cylinder. To balance the three carburetors there is a union channel in the manifold casting between the three inlet channels.

The high-speed system consists of a choke tube (K), main jet (Gg), correction jet (a) and emulsion tube (s), which in combination ensure that the carburetor obtains the correct fuel-air ratio in the high speed areas.



S 133

Carburetor, Solex 34 BIC

a	Correction jet	I'	Starter lever
F	Float	P	Float valve
Ga	Starter air jet	s	Emulsion tube
Gg	Main jet	U'	Pilot air bleed
Gs	Starter fuel jet	V	Throttle flap
gN	Pilot jet	W	Volume screw for fuel-air mixture
K	Choke tube	Y	Main jet retainer

6 FUEL SYSTEM



The slow-running system is a series-connect bypass system consisting of a pilot air bleed (U'), pilot jet (gN) and a volume screw for the fuel-air mixture (W). As well as this there is a volume screw for air in the inlet manifold, which is common to all carburetors. The air to this volume screw comes through a hose from the air cleaner and continues up channels in the inlet manifold to the slow running systems of the three carburetors. The mixing ratio of the slow running system can be varied by the inlet manifold volume screw. The volume screws for the fuel-air mixture on the carburetors (W) are carefully preset at the factory with the aid of a special flow gauge and locked with stop nuts.

WARNING

The carburetor volume screws for the fuel-air mixture may not be loosened or readjusted.

On the throttle spindles between the three carburetors there is a connection with adjusting screw for synchronization.

The slow running speed of the engine is set with the throttle screw on each carburetor. Synchronization and slow running settings require precision and access to a special negative pressure gauge called "Synchro-Test".

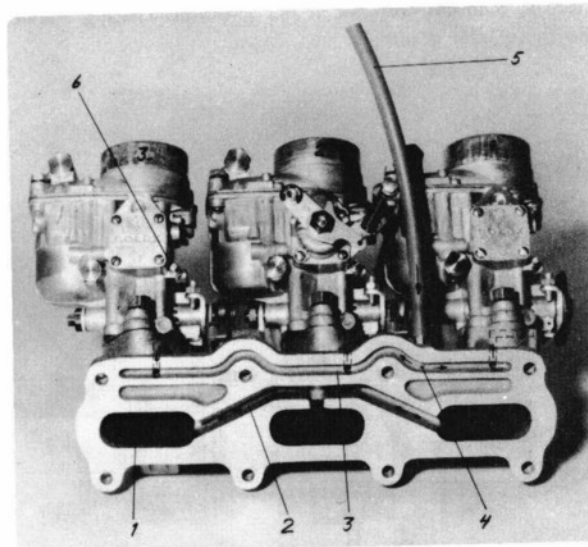
There is a starter unit on the centre carburetor only, and the fuel-air mixture is distributed to the other cylinders through the balancing channel in the manifold. The starter fuel-air mixture is determined by a starter fuel jet (Gs) and an air jet (Ga). The amount of fuel-air mixture is regulated with a sliding valve which is spring loaded for return from the completely open position to the half open.

The throttle flap may not be opened when starting, as the starter unit then stops functioning.

DISASSEMBLY AND ASSEMBLY

When it is necessary to remove the carburetors always disconnect the inlet manifold, with the carburetors, from the engine block.

1. Remove the air filter.
2. Disconnect the fuel lines at the pump.
3. Disconnect the rubber boot from the plate on the 1st carburetors throttle spindle.
4. Disconnect the dynamo stay and starter linkage.
5. Release the inlet manifold, with the carburetors, from the engine block.
6. Remove the fuel hoses and carburetors from the inlet manifold. Take care of the companion springs.
7. Clean the carburetor externally and remove the float chamber cover.
8. Inspect the needle valve and gasket.
9. Inspect the float and see that it does not leak and inspect the float spindle and bearing. Clean the chamber.



Carburetors and inlet manifold

S 126

1. Channel to cylinder
2. Balancing channel
3. Distribution channel for air to slow-running system
4. Volume screw for air
5. Hose for air to volume screw
6. Volume screw for fuel-air mixture
(NB May not be altered)



10. Inspect the main jet, pilot jet, correction jet and emulsion tube.
11. Inspect the starter slide (wear in the surface). Inspect the fuel jet, the air jet and the lever return movement.
12. Inspect the throttle spindle regarding wear.

WARNING

The carburetor volume screws for the fuel-air mixture are locked and may not be altered. The adjustment of these screws requires special equipment which is only available at the factory.

13. Clean all parts and reassemble the carburetor.
14. Fit on the carburetors to the manifold. Fit the companion screws and springs.

NOTE

The companion springs are of varying hardnesses. If the throttle control linkage is to operate the forward carburetor (3rd) shall be fitted with the softest spring, the second carburetor has one which is somewhat harder and the coil spring on the control shaft is the hardest (See illustration).

15. Fit the inlet manifold, with carburetors, onto the engine block and connect the fuel hoses, dynamo stay and throttle linkage and starter linkage.
16. Fit the air filter and warm up the engine. Then carry out synchronization and slow-running adjustments.
17. Inspect the float level if necessary.

ADJUSTING THE FLOAT LEVEL

The float level is adjusted when the carburetors are installed in the car.

1. Keep the engine idling so that the fuel level stabilizes in the float chambers.
2. Switch off without moving the throttle linkage.
3. Disconnect the fuel hose at the fuel pump so that excess fuel is drained off.
4. Remove the air cleaner and float chamber cover.
5. Measure the float level with a sliding gauge. The clearance between the float chamber top and the fuel surface should be 20 ± 1 mm (0.78 in. ± 0.04).
6. Adjust the float level if necessary, by filing off the fibre washer under the needle valve or by placing in an extra washer.

WARNING

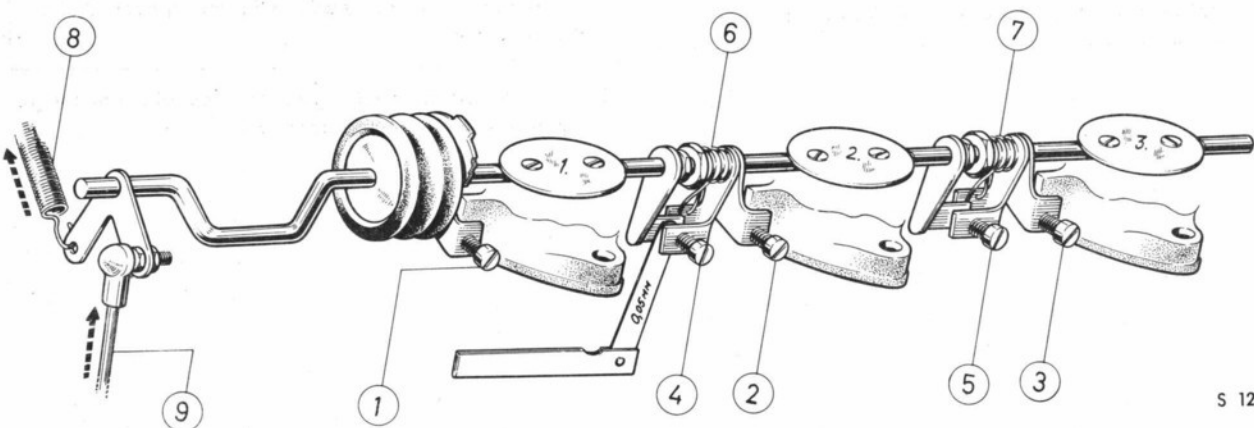
The float lever may not be readjusted. Adjustment must be made with the spacer under the needle valve.

7. After adjusting check again to ascertain that the required result has been obtained.



SYNCHRONIZATION AND SLOW RUNNING ADJUSTMENT

1. Warm up the engine.
2. Remove the air cleaner and unscrew the companion screws (See the illustration) until they are about 2 mm (0.08 in.) from their fully screwed in position.
3. Screw in the volume screw on the manifold and then open 1½ turn from the closed position.
4. Start the engine and set the engine speed provisionally at 800—1000 r.p.m. with the aid of the throttle screws.



S 127

Throttle linkage

- 1, 2 and 3. Throttle screws for the respective cylinders
- 4 and 5. Companion screws
- 6. Hard spring
- 7. Soft spring
- 8. Return spring
- 9. Throttle control

5. Place the Synchro-Test unit on one of the carburetors and adjust the valve of the unit so that the float is in the middle of the sighting glass.
6. Move the Synchro-Test onto the next carburetor and adjust the throttle screw until the same value is obtained. See the illustration.
7. Repeat this on all the carburetors, so that a suitable idling speed (800—1000 r.p.m.) is obtained, as the same time as the Synchro-Test unit gives the same reading on all carburetors.
8. Make sure that the volume screw of the manifold gives an idling as even as possible. Adjust it, if necessary 1/2 turn in or out from the original position of 1 1/2 turns.
9. If necessary readjust the idling speed with the throttle screws and recheck with the Synchro-Test unit.
10. Screw in the two companion screws so that they are in their fully screwed in positions with just a little clearance. The clearance should be 0.05 mm. See the illustration.
11. Fit the air cleaner and preheater pipe. Make sure that the hose from the manifold volume screw is placed in the hole of the air cleaner.

CLEANING THE CARBURETOR

The carburetors need not be removed from the engine for cleaning.

1. Remove the air filter.
2. Disconnect the fuel lines at the carburetors.
3. Clean the filters in the carburetors.
4. Loosen the three screws in the float chamber cover and lift off the cover. Take care of the gasket.
5. Clean the float valve.
6. Lift out the float.
7. Remove the main jet.
8. Remove the pilot jet.
9. Remove the starter jet.
All of these jets are easily accessible.
10. Blow the float chamber, channels and jets clean.

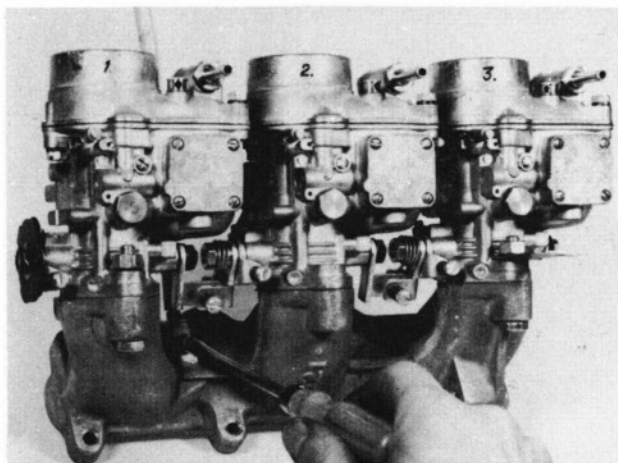
WARNING

The carburetor volume screws are locked and may not be altered.

11. Assemble the carburetor, in the opposite order. Make sure that there are no faults with the gasket under the float chamber cover.

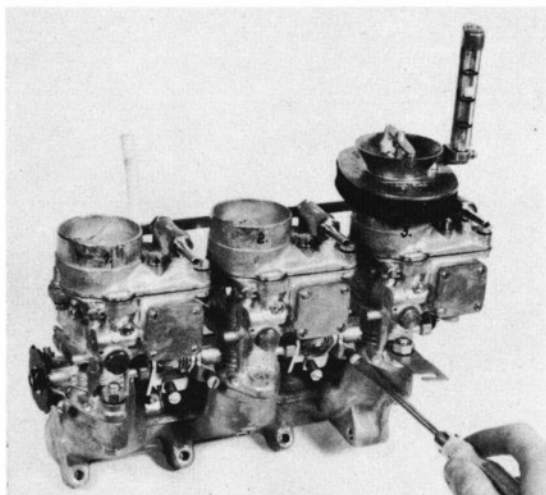
NOTE

It is suitable to clean fuel pump filter at the same time.



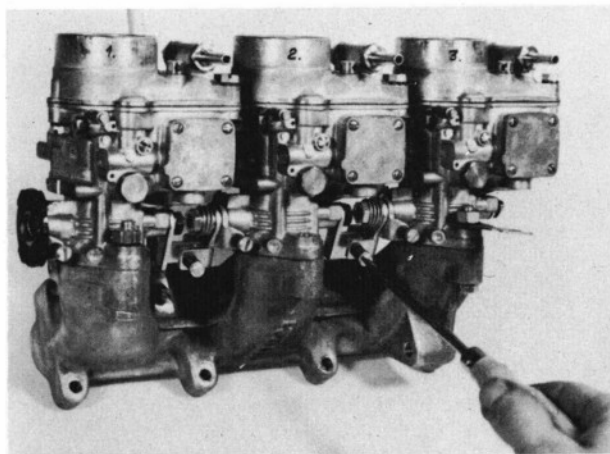
Adjusting the volume screw

S 128



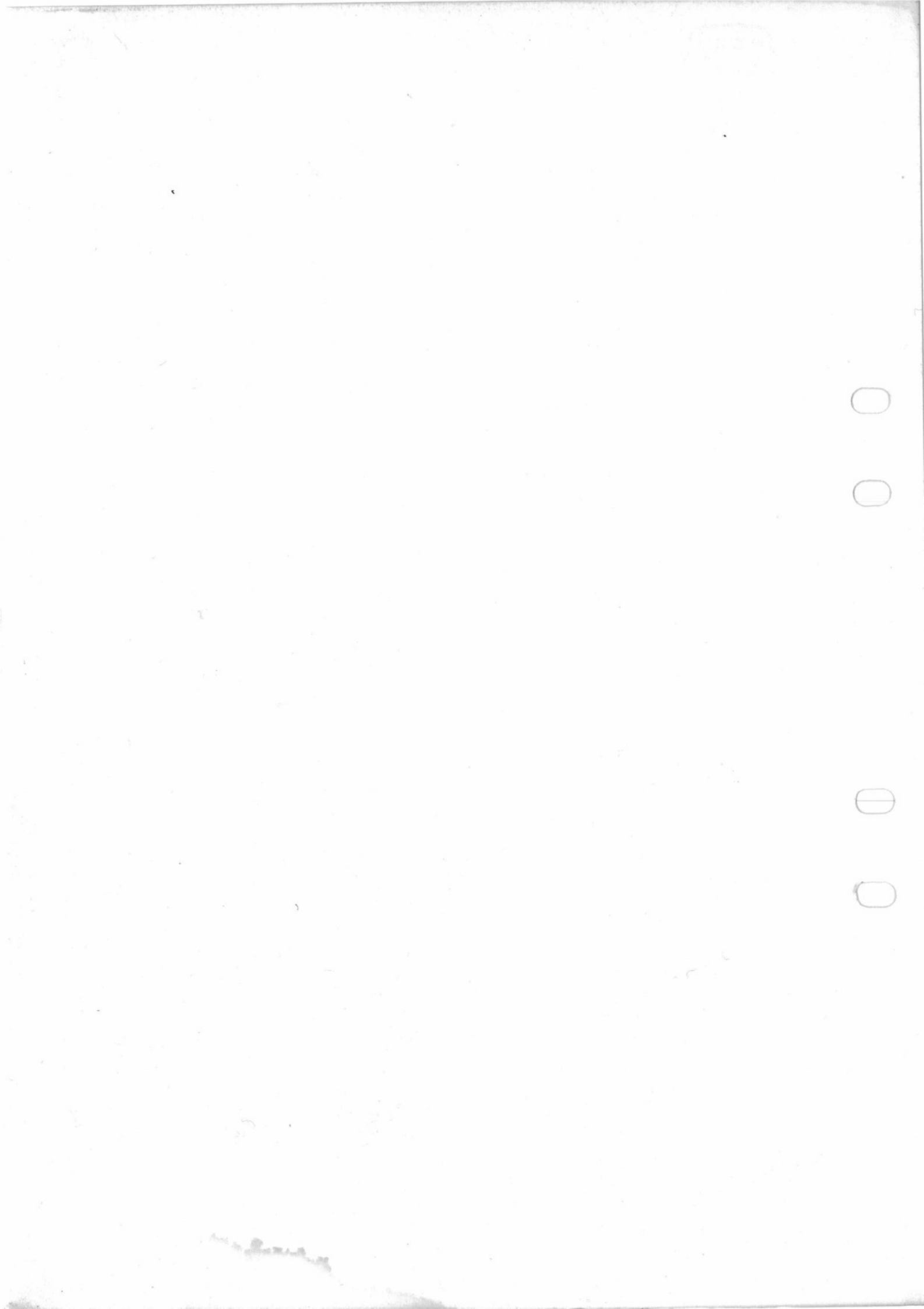
Adjusting the throttle screw with the aid of a Synchro-Test unit

S 129



Adjusting the companion screw

S 130





5. Air filter

AIR FILTER AND PREHEATER UNIT

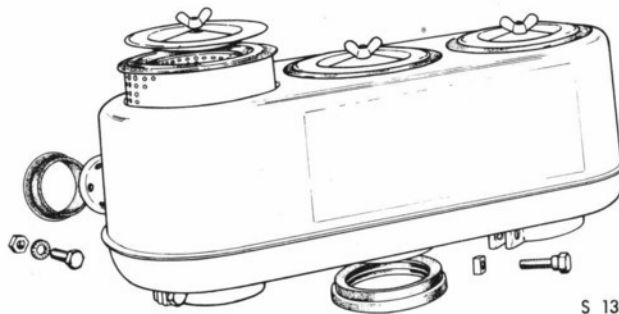
The air filter consists of three separate inserts in a common casing, which also serves as a silencer for the inducted air. The preheater is the same as that for the Saab 96 except that the dimensions are different. The removeable preheater pipe should be fitted to prevent the formation of ice the carburetors.

NOTE

The preheater pipe should only be removed when there are long periods of very warm weather.

FILTER INSERTS

The replaceable filter inserts should normally be replaced after every 30,000 km. When driving on dusty roads the inserts should be replaced more often. Clean the air filter well internally when replacing inserts. The inserts may absolutely not be washed in kerosene nor oiled in.



Air filter with insert



Contents

Section

- 1. DESCRIPTION**

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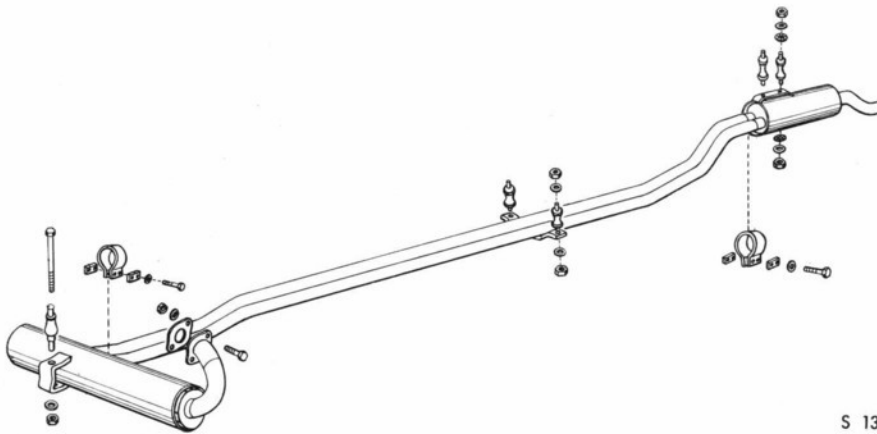
EXHAUST SYSTEM



1. Description

GENERAL

The exhaust system is composed of a forward and a rear muffler with an intermediate exhaust pipe. The exhaust pipe is double and has an internal diameter of 34 mm (1.34 in.). The anchorage to the body and connection to the engine are the same as for the Saab 95 and 96. See the illustration.



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Exhaust system



Contents

Section

1. TECHNICAL DATA
2. DESCRIPTION
3. FRONT WHEEL BEARINGS



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1. Technical data

SPECIFICATIONS

Front shock absorbers, length	250 mm (9 ³ / ₄ in.) (extended 370 mm 14 ¹ / ₂ in.)
Front shock absorbers, compression, installed	82 mm (3 ¹ / ₄ in.)
Front coil springs, number of coils (material diameter 11.7 mm)	11 coils
Front coil spring, length	380 mm (15 in.)
Maximum spring depression, front	140 mm (5 ¹ / ₂ in.)
Front wheel angles, unloaded car:	
King pin inclination	7° ± 1°
Caster	2° ± 1/2°
Camber	3/4° ± 1/4°
Toe-in, measured on rim	2 mm ± 1 (0.08 ± 0.04 in.)
Turn angle:	
Outer wheel	20°
Inner wheel	22 ¹ / ₂ ° ± 1 ¹ / ₂ °

TIGHTENING TORQUES

Castellated nut, front wheel hubs	18 kpm (130 lbs/ft.)
---	-------------------------

SPECIAL TOOLS

The following Saab tools are of use when working on the front axle and suspension.

Description	Tool No.
Tool for measuring toe-in	784001
Wheel puller	784002
Tool for pressing out steering rod ends	784004
Wrench for shaft seal nut, front wheel hubs	784020
Driver for removal of ball bearing, front wheels	784075
Spring press for compression of coil springs	784081
Tool for removal and installation of coil springs	784082
Spacer for wheel puller	784129



2. Description

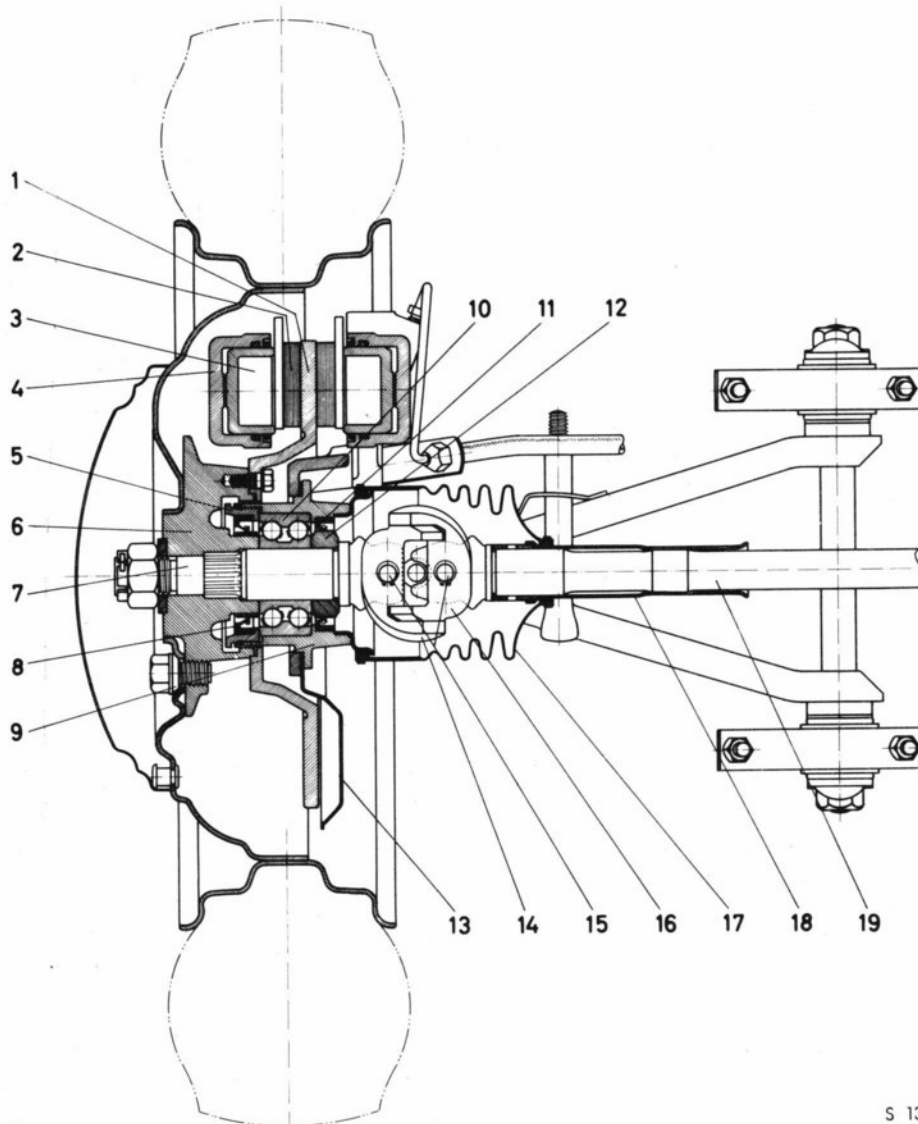
GENERAL

As the Saab "Granturismo 850" (Saab 96 Sport) is equipped with front wheel disc brakes the hubs and bearings differ from the Saab 96. The other components such as the spring arms with ball joints and rubber bearings, coil springs with guards and stabilizer are identical to the Saab 96. The front wheel angles are also the same.

Instead of the brake drum, which is a part of the hub on the Saab 96, Saab "Granturismo 850" (Saab 96 Sport) has a special hub on which the brake disc is bolted. The wheel is anchored to the hub by only four bolts. The steering knuckle housing is the same as for the Saab 96 and is equipped with a retainer for the brake housing.

9

FRONT AXLE AND SPRINGING



S 135

Front axle unit, right

- | | |
|-----------------------------|--------------------------------|
| 1. Brake disc | 11. Shaft seal |
| 2. Brake pad | 12. Spacer ring |
| 3. Brake piston | 13. Backing plate |
| 4. Brake housing | 14. Outer universal joint half |
| 5. Nut | 15. Pins |
| 6. Hub | 16. Inner universal joint half |
| 7. Outer drive shaft | 17. Rubber cuff |
| 8. Shaft seal | 18. Sealing sleeve |
| 9. Steering knuckle housing | 19. Inner drive shaft |
| 10. Ball bearing | |

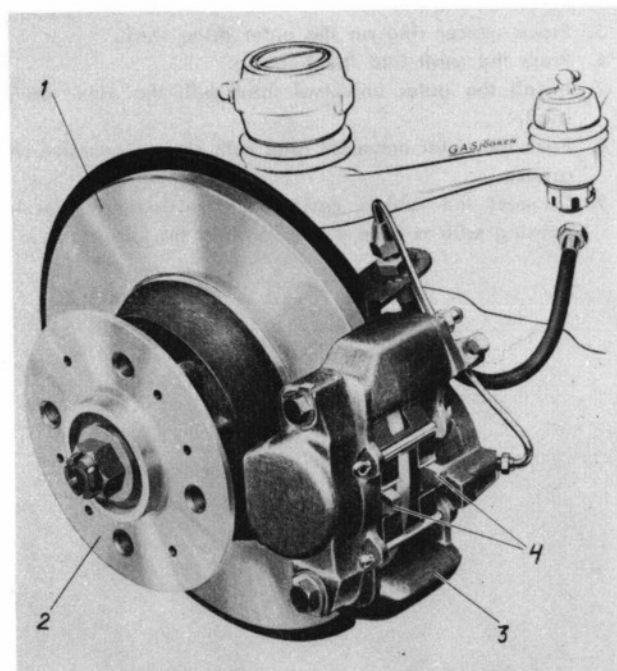
3. Front wheel bearings

REPLACEMENT OF BALL BEARINGS IN FRONT WHEEL HUBS

After extensive running the front wheel bearings can become worn and play appears, especially if lubrication has been sparse. As this can have an extremely detrimental effect on the steering properties of the car the bearings must be replaced. Play in the wheel bearings is easily examined by first lifting up the front end and then holding the wheel firmly at the top and bottom and rocking it to and fro in the transverse direction. Any play will be felt immediately. Should the play, measured at the rim, exceed 2 mm (0.08 in.) the wheel bearing must be replaced. Note that as well as the previously mentioned tools for the removal and fitting of the wheel bearings, a press must also be used. The wheel bearings may not under any circumstances whatsoever be exposed to blows of any sort, as they can then be damaged.

DISASSEMBLY

1. Remove the hub cap and loosen the shaft nut.
2. Block up the front end of the car, take off the wheel and remove the shaft nut.
3. Remove the brake housing by unscrewing the two bolts on the inside of the housing. NB. Not the bolts on the outside. The bolts are locked with a tab. Hang up the brake housing so that the brake hose is not damaged.
4. Pull off the hub with brake disc. Use wheel puller 784020 together with spacer 784129.
5. Disconnect the steering arm and upper ball stud from the steering knuckle housing.
6. Disconnect the clamping screw, which holds the lower ball stud to the steering knuckle housing.
7. Pull the drive shaft out of the inner universal joint and remove the whole of the front axle section. Then clean it thoroughly.
8. Disconnect the hose clamp and move the rubber cuff to one side, see the illustration. Remove the lock ring and nut at the joint and remove the inner drive shaft with joint and rubber casing.
9. Remove the nut with shaft seal. Use wrench 784020. First break the nut lock with a drift or something similar.
10. Remove the outer drive shaft by pressing on the threaded ends. Take care of the spacer washer at the inner seal.
11. Press the bearing out of the steering knuckle housing from the inside.
12. Remove both of the seal rings from their seats in the steering knuckle housing and nut respectively if they need replacing.



Front axle unit with disc brake

S 136

1. Brake disc
2. Hub
3. Brake housing
4. Brake pads

9

FRONT AXLE AND SPRINGING



ASSEMBLY

All parts must be cleaned and worn or damaged parts must be replaced. Pay special attention to the shaft seals and rubber cuffs.

1. If the seal rings in the steering knuckle housing have been removed, press in new seal rings.
2. Pack the ball bearing with ball bearing grease, see Chapter 19. Only use original bearings.
3. Press the ball bearing into the steering knuckle housing with the number designation on the bearing cup outmost. Use tool 784075.
4. Screw on the nut with the shaft seal and lock the nut.
5. Place spacer ring on the outer drive shaft.
6. Press the shaft into the bearing.
7. Install the outer universal joint with the inner drive shaft.
8. Pack the outer universal joint with chassis or universal grease.
9. Connect the rubber casing to the steering knuckle housing with a hose clamp around the casing.
10. Grease the inner drive shaft with graphite grease or chassis grease and push the shaft in the inner universal joint.
11. Connect the steering knuckle housing to the steering arm and lower ball stud.
12. Fit the hub and brake disc onto the drive shaft.
13. Fit on the washer and shaft nut. Coat the washer with Permatex No. 3.
14. Fit the brake housing. Take care that the brake pads are not damaged. Lock the bolts with tabs.
15. Fit on the wheel and lower the car.
16. Tighten the shaft nut to a torque of 18 kpm (130 lbs./ft.) and lock with a cotter pin. Fit on the hub cap.

WARNING

The brake pads must be returned to their position near the disc, this is done by continued pumping action on the brake pedal. Otherwise the brakes will not work.



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- 1. TECHNICAL DATA**
- 2. DESCRIPTION**
- 3. DISC BRAKES**

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FRANK SYSTEM





1. Technical data

SPECIFICATIONS

GENERAL

Manufacture	Lockheed
Type, front	Disc brake
Type, rear	Drum brake, one leading shoe
Footbrake	Hydraulic
Handbrake	Mechanical

DIMENSIONS, ETC.

Brake disc, front	10 ³ / ₄ " (273 mm)
Brake drum, rear, model II	8" (203.2 mm)
Master cylinder, model II	³ / ₄ "
Wheel brake cylinder, front	2"
Wheel brake cylinder, rear, model II	³ / ₄ "
Brake shoes, rear, model II	8" × 1 ¹ / ₂ "
Brake hoses, front	10 ¹ / ₂ "
Brake hoses, rear, model II	8 ¹ / ₂ "
Brake line, reservoir/master cylinder	Hose
Other brake lines	³ / ₁₆ " Bundy piping
Brake fluid	Lockheed HD 328 "Disc brake fluid", or equal as per detailment SAE 70 R 3.
Clearance between master cylinder piston and pushrod ..	min. 0.8 mm (0.03 in.)
Same clearance measured at point of brake pedal	5—10 mm (0.2—0.4 in.)
The brake drum may only be turned to a max. diameter of	204.7 mm (7.665 in.)
Radial throw, brake drum, total gauge reading	max. 0.15 mm (0.006 in.)
Axial throw, brake disc, total gauge reading	max. 0.2 mm (0.008 in.)

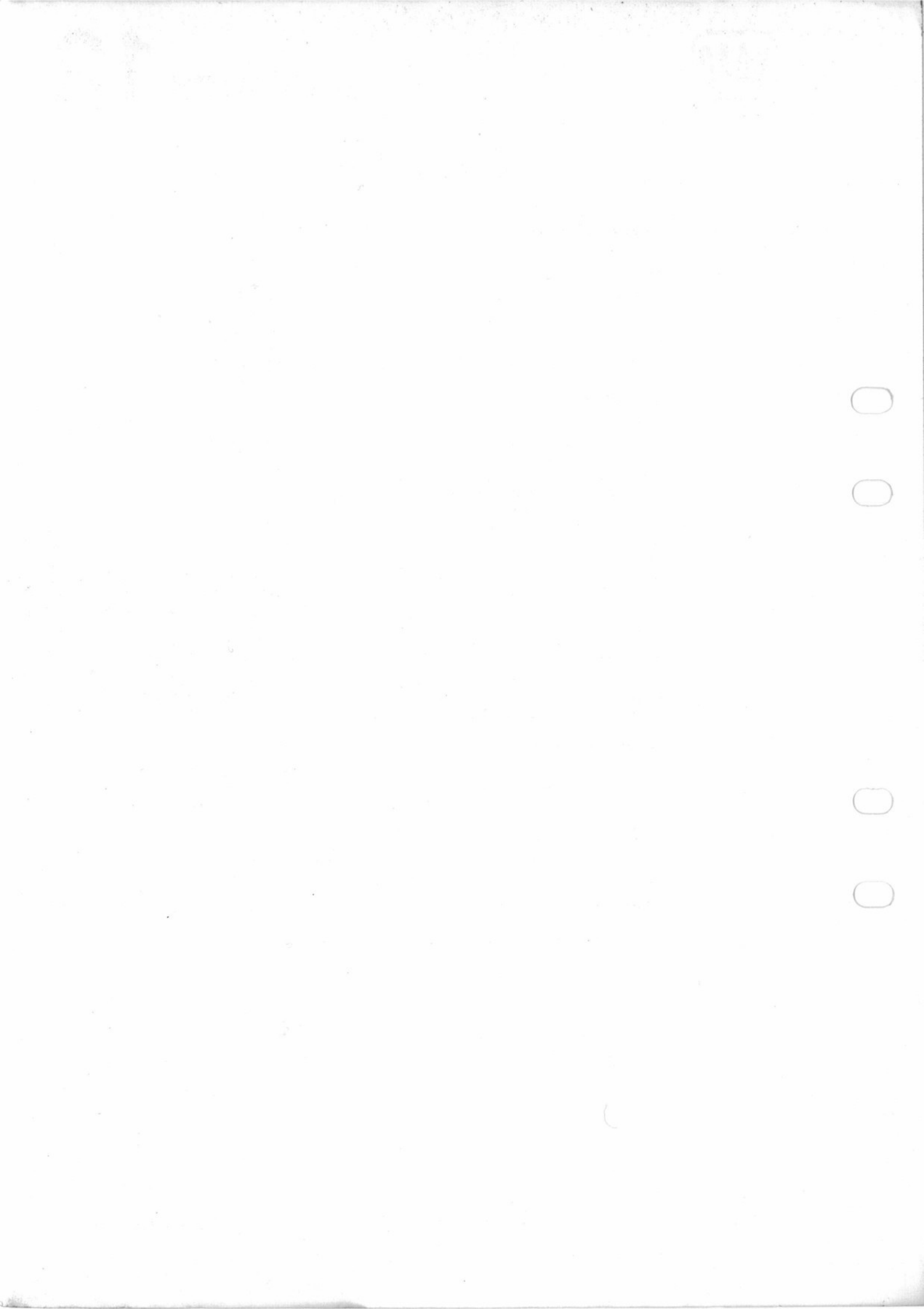
TIGHTENING TORQUES

Slotted nut, front hub	18 kpm (130 lb.ft.)
Slotted nut, rear hub	9.5 kpm (68.5 lb.ft.)
Bolts for brake housing	5.2 kpm (37.5 lb.ft.)

SPECIAL TOOLS

The following Saab special tools are of use when working on the brake system:

Description	Tool No.
Wheel puller	784002
Spacer for wheel puller	784129
Screw clamp for brake piston	784132





2. Description

GENERAL

The Saab "Granturismo 850" (Saab 96 Sport) is equipped with disc brakes on the front wheels and drum brakes on the rear. The brake system is manufactured by Lockheed.

The following parts are the same as on the Saab 96: Master cylinder, brake lines to rear end, pressure regulating valve, rear backing plate with wheel brake cylinders and handbrake. Descriptions of these parts are found in the service handbook for the Saab 96.

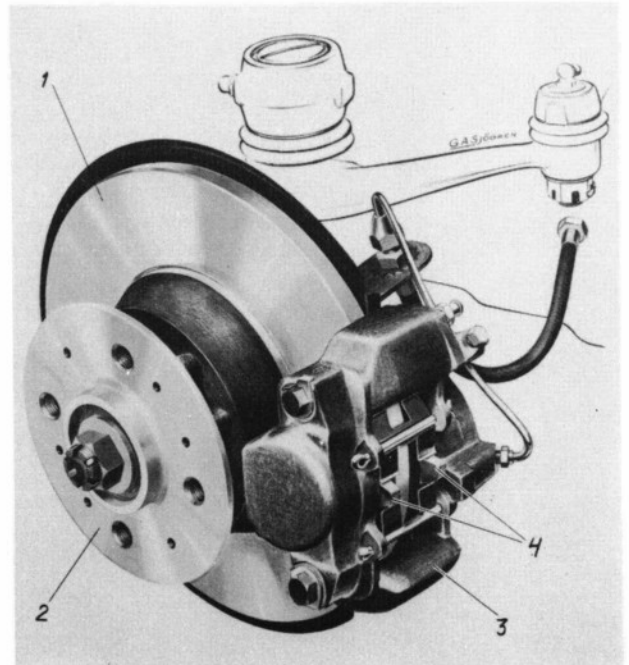
DISC BRAKES

The front wheel disc brakes consist of a brake disc, which is attached to the hub, and which rotates with the wheel. On each side of the disc there is a brake pad which, when braking, is pressed against the disc by a piston. The brake disc is thus squeezed between the two pads. The brake pistons are encased in a divided brake caliper, which surrounds a segment of the disc. The brake fluid is distributed in the brake caliper to both of the brake cylinders, and there is a bleeder screw fitted at the highest point. The brake caliper is bolted to a retainer which is attached to the steering knuckle housing.

The pistons have a large diameter — 2". The piston seals are in grooves in the cylinders. The pistons have a completely smooth surface. The outer seal is to prevent the entrance of dust and dirt and the inner seals for brake fluid.

The pistons press directly onto the brake pads, which are kept into position with two springs and cotter pins. The cotter pins and springs are removed when the pads are to be replaced. There are no return springs for the pads as the disc brakes are self-adjusting.

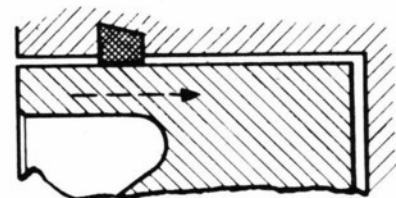
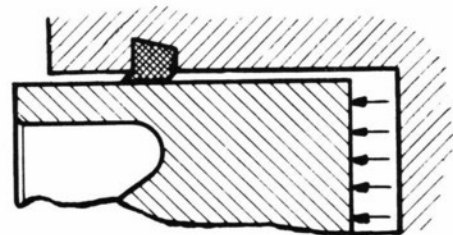
When brakes are applied brake fluid is transmitted from the master cylinder to the wheel brake cylinders, and the brake pistons press the pads against the disc. When the brake pedal is released the pistons return a few hundredths of a millimetre due to the springing in the piston seal (see the illustration). This return is sufficient to ensure that the pads do't lie against the disc. Wear on the pads is compensated as the pistons move out as the pads are worn down. When the brake pads are worn down it is not possible to see this by an unusually great pedal free travel.



Front axle unit with disc brake

S 136

- | | |
|---------------|---------------|
| 1. Brake disc | 3. Caliper |
| 2. Hub | 4. Brake pads |



S 138

Brake piston pushed back by influence of piston seal

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Faint text or labels associated with the diagrams below.

3. Disc brakes

GENERAL

The brake pads must be inspected at regular intervals, at least after every 8000 km (5000 miles). The brake pads must be replaced when 1.5 mm (0.06 in.) lining remains.

The disc brakes are self-adjusting and as the linings wear the pistons come further out, this results in the level of the brake fluid sinking in the reservoir. For this reason the fluid level in the reservoir must be checked regularly.

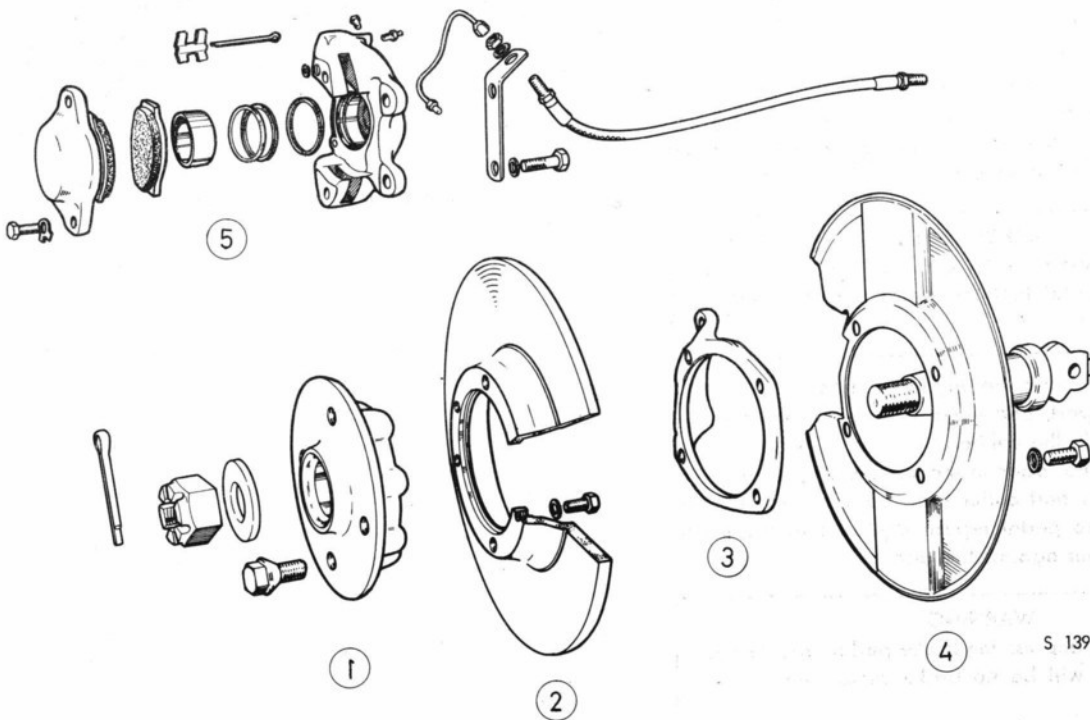
Brake hoses should be inspected every 15.000 km (9000 miles), regarding leakage or other damage.

The rubber components of the brake system, such as brake hoses, piston seals, etc., should be replaced after 60,000 km (36,000 miles) or every third year.

IMPORTANT
Locked Disc brake fluid must be used.

IMPORTANT
The two halves of the caliper should not be separated unless absolutely necessary. All normal service can be carried out without taking them apart.

If the brake pedal travel is unusually great, about 2/3 of the distance to the toe-plate, the brake shoes on the rear wheels must be adjusted or replaced.



Disc brake components

1. Hub
2. Brake disc
3. Retainer
4. Backing plate
5. Caliper with pistons and pads

12 BRAKE SYSTEM



REPLACING THE BRAKE PADS

1. Raise the front end of the car and take off the wheel.

NOTE

It is unnecessary to remove the caliper from the car or to separate the caliper halves to replace the brake pads.

2. Remove the cotter pins and springs which retain the brake pad. Remove one of the pads. A light twist facilitates removal.
3. Clean the protruding end of the brake piston thoroughly with brake fluid. The piston surface must not be scratched. Make sure that the recess for the pad is free from rust or other deposits.
4. Press the piston back into the caliper with the aid of screw clamp 784132.

NOTE

When the brake pistons are pressed back into the cylinders the level in the brake fluid reservoir raises. It is possible that a certain amount of brake fluid must be drained off.

5. Make sure that the brake piston is in the right position, i.e. the recess in the contact surface against the brake pad shall face **downwards**.

IMPORTANT

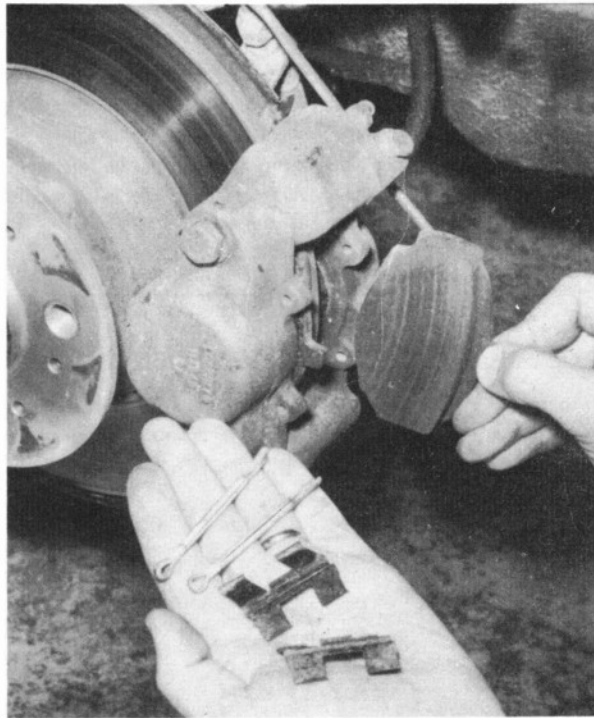
If the brake piston must be turned to the correct position, be careful that the piston sealing area is not damaged.

6. Wash the brake disc thoroughly with tri.
7. Fit the brake pad, and make sure that it goes easily into its recess in the caliper.
8. Replace the other pads in the same way (points 3—7).
9. Fit new springs and cotter pins. Lock the cotter pins.
10. Pump the brake pedal repeatedly, so that the brake pistons come out against the disc.

WARNING

Do not forget to depress the brake pedal repeatedly, otherwise there will be no brake action when it is needed.

11. Top up the brake fluid in the reservoir.



Replacing the brake pads

S 140



REPLACING THE BRAKE DISCS

When the brake disc, after extensive running, shows signs of bad wear it must be replaced. Reasonably deep scratches do not mean that the disc need be replaced. Unevenness which can be felt when running the finger around the disc in the direction of rotation can, on the other hand, cause excessive wear to the brake pads.

The brake disc may not be turned on a lathe.

The brake disc is replaced as follows:

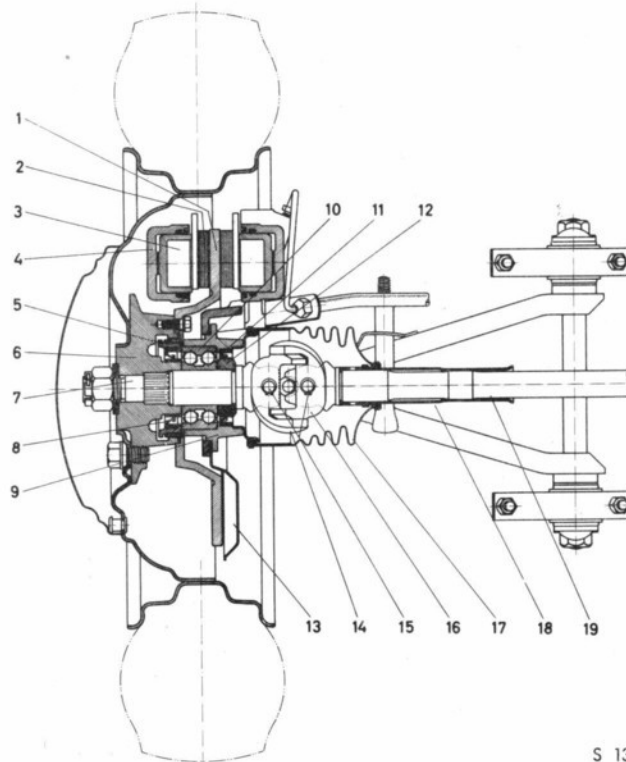
1. Remove the hub cap and loosen the shaft nut.
2. Block up the front end of the car, take off the wheel and remove the shaft nut.
3. Remove the two bolts which hold the caliper to the steering knuckle housing. The bolts are accessible on the inside of the brake disc.

4. Lift the caliper free of the brake disc, but do not disconnect the brake hose. Be careful that the brake pads are not scratched. Hang up the caliper in such a way that the brake hose is not damaged.
5. Pull off the hub with disc. Use wheel puller 784020 and spacer 784129.
6. Disconnect the disc from the hub.

Fitting is carried out in the reverse order. When fitting the caliper bolts always use a new tab.

NOTE

After fitting do not forget to depress the brake pedal repeatedly so that the brake pistons come out against the disc.



S 135

Front axle unit, right

- | | |
|-----------------------------|--------------------------------|
| 1. Brake disc | 10. Ball bearing |
| 2. Brake pad | 11. Shaft seal |
| 3. Brake piston | 12. Spacer ring |
| 4. Caliper | 13. Backing plate |
| 5. Nut | 14. Outer universal joint half |
| 6. Hub | 15. Pins |
| 7. Outer drive shaft | 16. Inner universal joint half |
| 8. Shaft seal | 17. Rubber cuff |
| 9. Steering knuckle housing | 18. Seal sleeve |
| | 19. Inner drive shaft |

12 BRAKE SYSTEM



REMOVING THE BRAKE PISTONS AND SEALS

This operation requires a special screw clamp, Tool No. 784132, see the illustration.

1. Block up the front end of the car and take off the wheel.
2. Take off the cotter pins and springs which retain the brake pads. Remove the pads. A light twist helps with the removal.
3. Remove the two bolts which hold the caliper onto the steering knuckle housing and disconnect the brake line connection at the caliper.
4. Lift off the caliper from the disc.

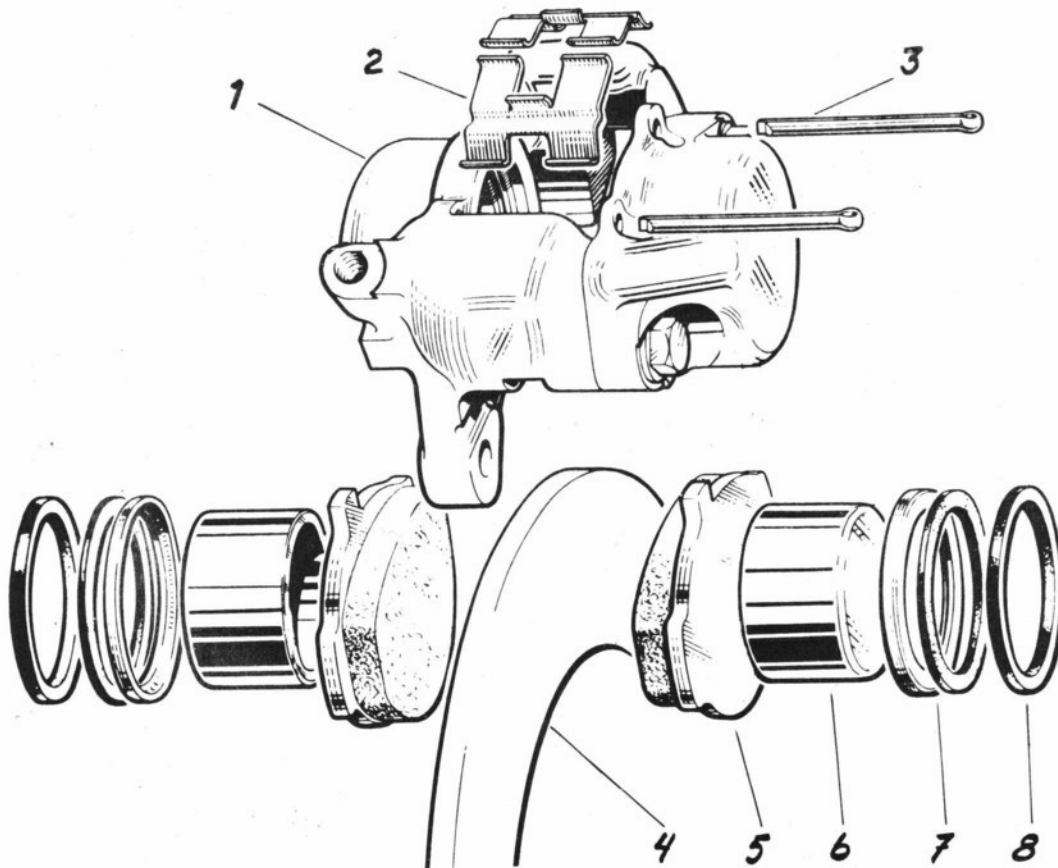
5. Clean the caliper externally and dry thoroughly.
6. Connect screw clamp 784132 to one of the brake pistons and push it out with the aid of compressed air in the brake pipe connection. Take care not to drop and damage the piston.

NOTE

Absolute cleanliness must be observed when the brake piston has been removed, so that no particles nor oil get into the brake system.

7. Use a blunt tool and remove the seal from the cylinder. Do not damage the groove for the seal nor the cylinder.

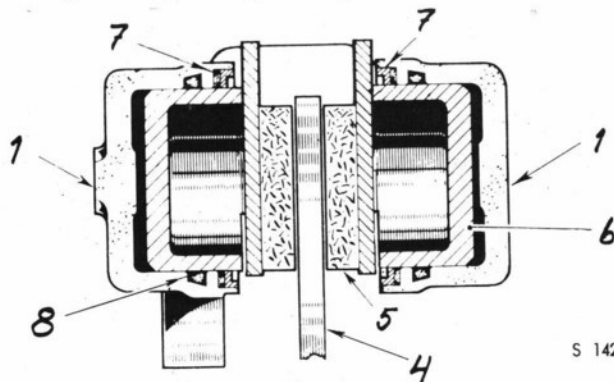
NOTE
It is unnecessary to separate the caliper.



S 141

Brake caliper with pistons and pads

1. Caliper
2. Spring
3. Cotter pin
4. Disc
5. Pad
6. Piston
7. Dust seal with retainer
8. Brake fluid seal



S 142



8. If necessary, the outer dust seal can now be removed with a screwdriver.

IMPORTANT

When cleaning the brake cylinder only brake fluid or denaturized spirit may be used. Otherwise the seal between the caliper halves can be ruined.

9. When the seals and piston have been refitted (see fitting) the other piston can be removed. The method of removal is the same in the case of both pistons.

FITTING THE BRAKE PISTONS AND SEALS

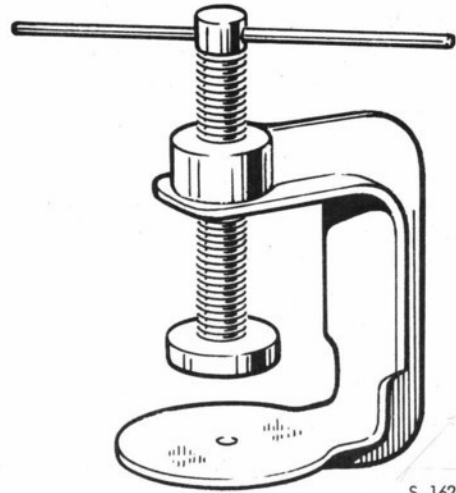
Make sure that all parts are clean and not faulty.

1. Coat a new seal with a special lubricant — Lockheed Disc Brake Lubricant. The seal must be dry before applying the lubricant. Place the seal carefully into its groove, and twist it around with your finger so that it fits in properly.
2. Coat the piston with the same lubricant and fit it so that the recess in the contact surface against the pad faces **downwards**. Push the piston carefully into the cylinder, and make sure that it goes in evenly. To facilitate the fitting of the dust seal do not push the piston right in, leave about 8 mm (0.3 in.) outside of the caliper.
3. Take a new dust seal and lubricate it with the special lubricant. The seal must be dry before lubrication.
4. Place the seal in the cylinder opening and retainer with the countersink side outwards. Press the retainer and brake piston right in with the aid of screw clamp 784132.
5. The brake piston and seal in the other cylinder are fitted in the same way.
6. Connect the brake pipe to the caliper and attach the caliper to the steering knuckle housing with the bolts. Fit on a new tab. Wash the brake disc with tri.

WARNING

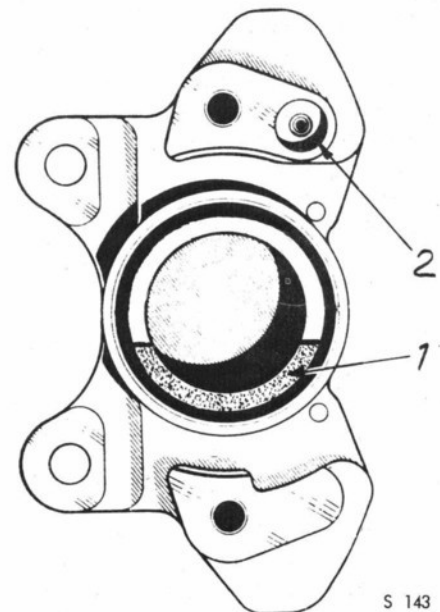
Do not depress the brake pedal without first opening the bleeder screws.

7. Fit the brake pads and new cotter pins and retainer springs.
8. Bleed the brake system and depress the brake pedal repeatedly to adjust the pads against the disc.



S 162

Screw clamp for brake pistons
Tool 784132



S 143

Brake piston position in caliper
1. Recess in piston
2. Hole for brake fluid channel gasket

12 BRAKE SYSTEM



DISASSEMBLY OF CALIPER

Do not separate the caliper halves unless new bolts, lock tabs and a gasket for the oil channel is available.

The bolts are made of a special material and it is not permissible to use any other type.

IMPORTANT

Do not separate the caliper halves unless it is absolutely necessary. All normal service can be carried out on the integral unit.

REMOVAL

1. Remove the caliper and remove the brake pads and, if necessary, the brake pistons (see removing the brake pistons).
2. Bend up the lock tabs and unscrew the bolts which keep the caliper together. See the illustration.
3. Separate the caliper and remove the gasket for the oil channel.

FITTING

1. If one of the caliper halves has been replaced or the piston removed fit the seal, piston and dust seal (See fitting the brake pistons).
2. Make sure that the sealing surface of each caliper half is absolutely clean, and that the threaded bolt holes are completely dry.
3. Fit a new gasket in the groove at the oil channel, and place the two caliper halves together. Make sure that the gasket is not knocked out of its position.
4. Fit two new bolts and lock tabs (NB. Only special bolts may be used). Make sure that the threads are dry.
5. Tighten the bolts to a torque of 5.2 kpm (37 lbs./ft.).

IMPORTANT

The threads on the bolts and in the caliper must be completely dry. Lubricated threads cause the bolts to be overloaded.

The tightening torque of the bolts, 5.2 kpm (37 lbs./ft.), must be carefully observed.

6. Bend the lock tabs according to the illustration.
7. Mount the brake pads and anchor the caliper with the two bolts to the steering knuckle housing. Fit a new tab.
8. Connect the brake line and bleed the brake system. Depress the brake pedal repeatedly to adjust the pistons and top up the brake fluid in the reservoir.

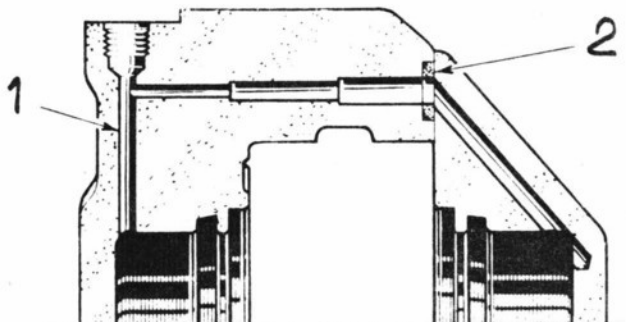
BLEEDING THE BRAKE SYSTEM

Bleeding is not a routine matter and is only necessary when a part of the brake system has been removed or when the brake fluid has been drained off.

There is a bleed nipple on the inner section of the caliper, and bleeding is carried out in the same way as on drum brakes.

IMPORTANT

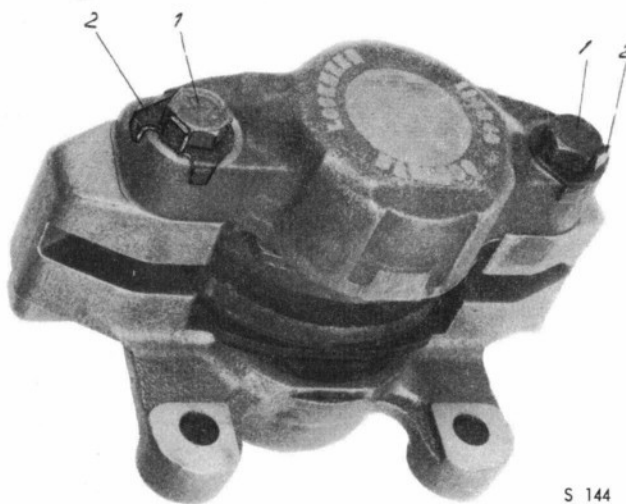
Use only Lockheed **Disc brake Fluid** which is specially made for disc brakes.



Brake caliper

S 145

1. Channel for brake fluid
2. Gasket in contact surface between caliper halves



S 144

Complete caliper

1. Bolts for integration of caliper
2. Lock tab.



Contents

Section

1. TECHNICAL DATA
2. DESCRIPTION
3. IGNITION SYSTEM
4. CABLES AND FUSES
5. OIL PRESSURE WARNING SYSTEM



1. Technical data

BATTERY

Voltage	12 V
Capacity	34 Ah

DYNAMO, Bosch

Type	LJ/GEG 160/12/2500+W30R4
Effect	240 W
Rated voltage	12 V
Rated speed	2,500 r.p.m.
Max. permissible load	20 A
Direction of rotation	Clockwise
Brush spring pressure	450—600 grammes (16—21 oz.)

CHARGING RELAY, Bosch

Up to chassis NO. 168.000

Type designation	RS/TBA 160/12/1
Cut-in voltage	12.4—13.1 V
Control voltage when idling	14.5—15.5 V
Control voltage when under load 15 A	13.4—14.4 V
Reverse current relay breaks at	2.0— 7.5 A

From chassis No. 168.001

Type designation	RS/VA 200/12 A (2/1)
Cut-in voltage	12.4—13.1 V
Control voltage when idling	13.8—14.8 V
Control voltage when under load 25A	13.3—14.3 V
Reverse current relay breaks at	2.0—7.5 A

STARTER MOTOR, Bosch

Type designation	AL/EDD 0.5/12R4
Number of teeth on pinion	9
Number of teeth on ring gear	97
Brush spring pressure	550—700 grammes (20—25 oz.)

DISTRIBUTOR, Bosch

Type designation	VJ 3 BR9T
Capacitor	LMKO 1 Z30
Ignition settings:	
Basic setting	10° B.T.D.C.
At 3,000 r.p.m.	20° B.T.D.C.
Order of firing (1st cylinder at rear)	1—2—3
Breaker clearance	0.3—0.4 mm (0.012—0.016 in.)
Dwell angle	80—84°
Contact pressure	1,100—1,200 grammes (39—42 oz.)
Direction of rotation	Clockwise
Axial play, distributor shaft	0.1—0.2 mm (0.004—0.008 in.)

IGNITION COIL

Type designation:	
combined with ignition switch	Bosch ZS/KZW 1/12 (1/6)
without ignition switch	Mallory Scott E3LC-134 or Bosch TkW 12 (1/6)
Pre-connection resistance	Mallory Scott 201005

SPARK PLUGS, Champion

Type	Surface gap
Designation	UK-16V
Spark plug gap, new plug	0.7 mm (0.03 in.)
Spark plug gap, max.	1.2 mm (0.05 in.)
Thread	18 mm
Tightening torque	2 kpm (14.4 lbs/ft.)



BULBS

Number	Part Name	W	Saab No.	Philips No.
4	Bulb, fuel gauge, thermometer, speedometer	1.2 W	719018	Tungsrn 2695
6	instruments and indicators	2 W	708434	12829
2	tachometer, clock	2 W	715489	12913
2	headlamps	45/40 W	710872	12620
2	parkings lamps-flashers front ..	20/5 W or 32/4 Cp	709683	1034
2	tail lamps	5 W	715472	12821
2	brake lamps-flashers	25 W or 32 Cp	715471	1073
2	fog and spot lamps	35 W	713342	12247
1	interior lamp	5 W	708419	12844
2	back-up lamps	25 W	709683	1034
2	number plate illumination	5 W	708419	12844
1	trunk lamp	4 W	715730	12929

FUSES16 pcs. 8 Amp

FLASHER RELAY

Type designation:

Lucas FL 5 12 V 42 W

Hella 91 Pst 2x32 Cp 12 V

HORN

Type designation B 31 — 12 V

FUEL GAUGE TANK UNIT, VDO

Type designation VDO 625

WINDSHIELD WIPER MOTOR

Type designation:

SWF LHD car SWA 1105/66 b

SWF RHD car SWA 1105/66 r

HEATER FAN MOTOR

Type designation

Electrolux KS 3442/240

WINDSHIELD WASHER MOTOR, Bosch

Type designation WS/SPE 2/12/1



2. Description

GENERAL

The only differences between the electrical system in the Saab "Granturismo 850" (Saab 96 Sport) and that in the Saab 96 are the ignition system and cable net. There is an oil pressure warning relay, to check that the lubrication system is working satisfactorily.

IGNITION SYSTEM

The Saab "Granturismo 850" (Saab 96 Sport) is equipped with a special spark plug of the Surface gap type which is exceptionally suitable for two-stroke engines with heavy loading. These spark plugs have a low operating temperature which, among its advantages, prevents glow ignition. These plugs require high ignition voltage, which is obtained by a special ignition with a pre-connection resistance.

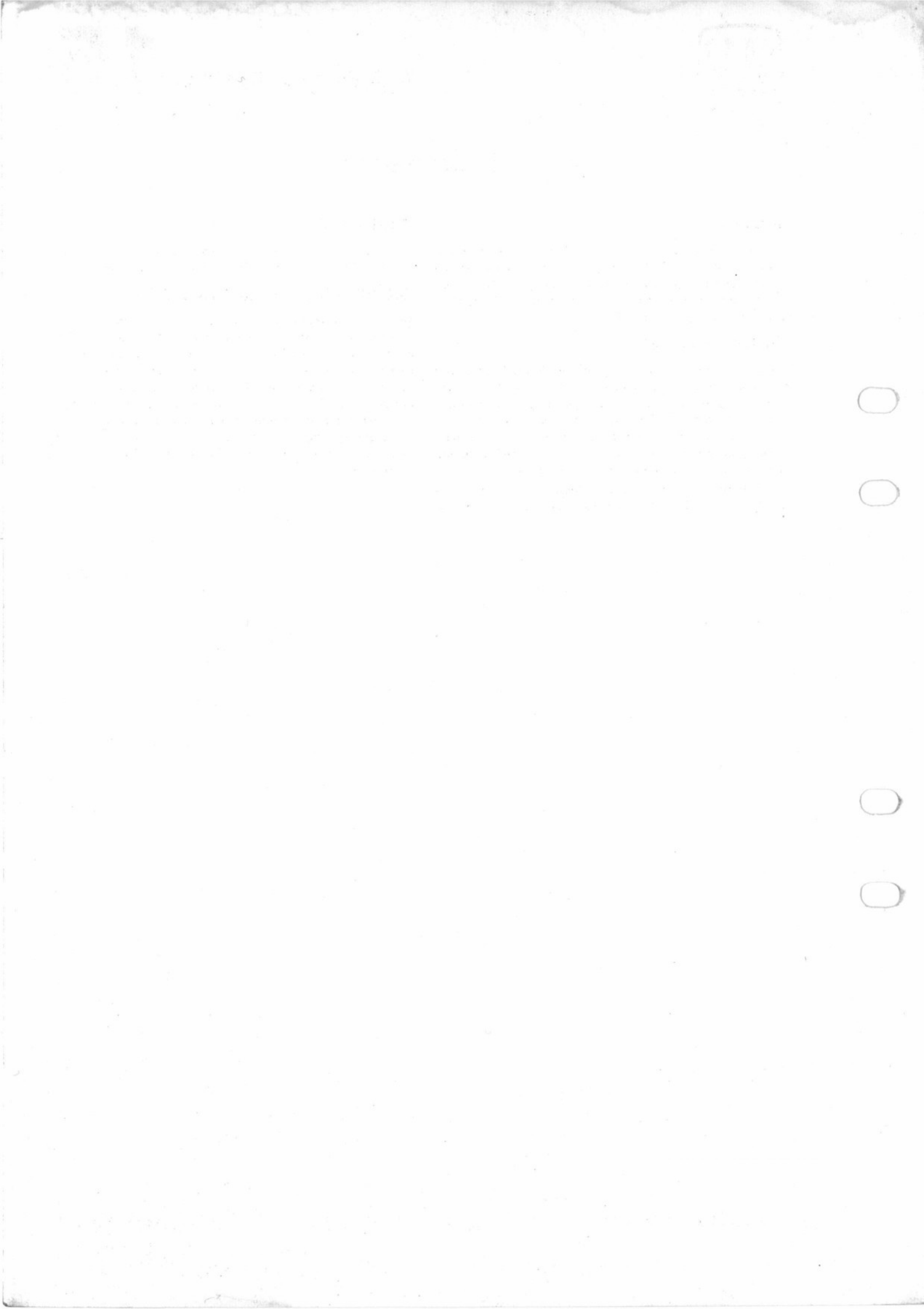
The distributor has no vacuum setting but has a centrifugally regulated ignition setting which works with one step.

CABLE NET

The cable net is built up in the same way as in the Saab 96, but differs regarding cable colours and numbers.

OIL PRESSURE WARNING RELAY

There is a warning lamp on the instrument panel which lights up when the oil pressure in the oil pump fails. The oil pump is equipped with an oil pressure warning sender which is influenced by the oil pressure and consists of a contact, which opens and closes once per revolution of the pump. The task of the oil pressure warning relay converts the openings and closings of the sender's contact so that the warning lamp is continually dark. If there is no oil pressure the contact is continually closed and the warning lamp ignites.



3. Ignition system

DISTRIBUTOR

GENERAL

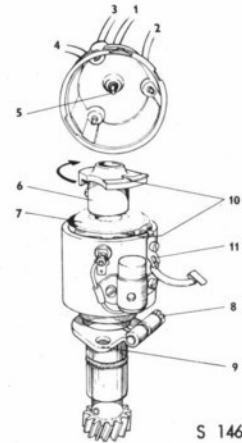
The distributor is manufactured by Bosch and is of type VJ3 BR9T. The method of dismantling and assembly described in the workshop handbook for the Saab 96 also apply for this distributor. The setting values are as follows:

Contact pressure	1100 grammes (39 oz.)
Contact clearance	0.3—0.4 mm (0.012—0.016 in.)
Dwell angle	80—84°

The distributor cap is furnished with vent holes and a protective cap under the rotor. The protective cap serves as protection against condensation, so it is important that it seals effectively. Sealing is effected by coating both sides of the cap with Bosch grease Ft 1 V4.

IGNITION REGULATION

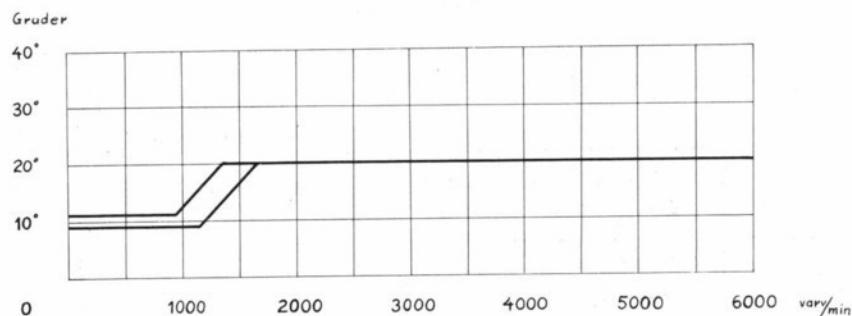
The ignition regulation at the various speeds are governed by the centrifugal governor in the distributor. The ignition regulations are according to the graph below.



S 146

Distributor

1. Ignition cable for 1st cylinder
2. Ignition cable for 2nd cylinder
3. Ignition cable for 3rd cylinder
4. High tension cable
5. Centre brush
6. Rotor
7. Protective cap
8. Lock screw
9. Lock plate
10. Marks for ignition setting
11. Spring anchorage



S 147

Ignition setting curve for distributor VJ3 BR9T



IGNITION SETTING

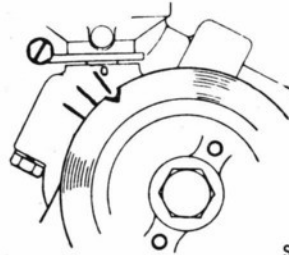
The order of firing is 1, 2, 3, whereupon 1 is the rear cylinder.

Ignition setting is always carried out on the 2nd cylinder (the centre cylinder).

The ignition is inspected and adjusted with the aid of a stroboscope at an engine speed of 3,000 r.p.m. This is a safer and better method than to set the ignition, with the engine standing still, with a testing lamp.

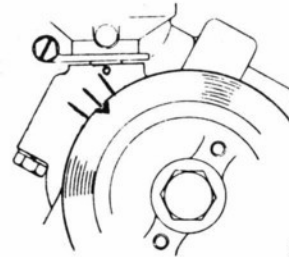
There is a mark on the pulley, at the front of the engine and three, perhaps only two, marks on the engine block according to the following:

- When the marking on the pulley is opposite the upper mark on the engine block the 2nd piston is in the top dead centre position. This upper mark is to check that the mark on the pulley tallies, and when re-marking the pulley after the crankshaft has been replaced or the pulley.
- When the pulley mark is opposite the centre mark on the engine block the 2nd piston is 10° B.T.D.C. This is the basic ignition position, and is used when setting the ignition on a stationary engine with the aid of a testing lamp, and when installing the distributor.
- When the pulley mark is opposite the lower mark on the engine block, the 2nd piston is 20° B.T.D.C. This is the ignition position at an engine speed of 3,000 r.p.m. and is used for ignition setting with the aid of a stroboscope. Note here that the engine speed shall be increased from idling and above the speed when the ignition regulation is carried out.



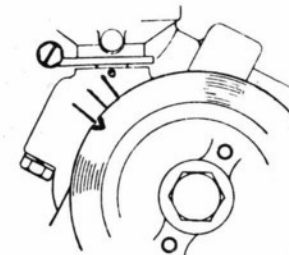
S 148

Ignition setting mark when the 2nd piston is in the T.D.C. position.



S 149

Ignition setting mark when the 2nd piston is 10° B.T.D.C.



S 150

Ignition setting mark when the 2nd piston is 20° B.T.D.C.

SETTING VALUES

Model	Distributor			Basic ignition position with stationary engine	Ignition position at 3,000 r.p.m. Setting with a stroboscope
	Bosch designation	Contact clearance	Dwell angle	Degrees on crankshaft B.T.D.C.	Degrees on crankshaft B.T.D.C.
Sport Saab 96	VJ3 BR9T	0.3—0.4 mm (0.012—0.016 in.)	80—84°	10°	20°



IGNITION SETTING WITH A STROBOSCOPE

1. Inspect the breaker points and the breaker arm, and adjust to the correct contact clearance. When fitting a distributor rotor always use a new spring washer so that the screw is effectively locked. Inspect and clean the distributor cap, ignition coil, ignition cables, spark plugs and the terminals at the plugs and distributor. Make sure that the ignitions are not nearer the casting than about 10 mm (0.4 in.) at any point.
2. Turn over the crankshaft so the mark on the pulley is opposite the centre mark on the engine block (The upper mark if there are only two marks).
3. Fit the distributor so that the rotor marking is opposite the mark on the edge of the distributor housing, and so that the lubricator comes forward.
4. Connect the stroboscope to the 2nd cylinder ignition cable and start the engine. Increase the engine speed successively. A clear alteration in the ignition position will be noticed at 1,000—1,500 r.p.m. When the engine speed is increased further the ignition position is constant. The ignition setting is carried out in this range by turning the distributor. When the mark on the pulley coincides with the **lower** mark on the engine block the distributor is locked with the lock screw.

IGNITION SETTING WITH A TESTING LAMP

If there should be no stroboscope available the ignition setting can be carried out with the aid of a testing lamp which is connected between the casting and the connection for the low-tension cable in the distributor.

1. Remove the distributor cap, rotor and protective cap. Inspect the breaker points and adjust the contact clearance.
2. Fit on the protective cap and rotor. Use a new lock washer so that the screw is effectively locked.
3. Turn over the crankshaft so that the mark on the pulley coincides with the centre mark on the engine block.
4. Fit the distributor so that the marking on the rotor is opposite the mark on the edge of the distributor housing, and so that the lubricator points forwards.
5. Connect a testing lamp between the casting and the connection for the low-tension cable on the distributor, and turn on the ignition.
6. Turn the distributor and find the position where the testing lamp ignites. Make sure that the centrifugal weights are in by turning the rotor anticlockwise. Lock the distributor by screwing in the lock screw.

7. Make sure that the adjustment is correct by turning over the crankshaft clockwise one turn. When the mark on the pulley comes opposite the **centre** marking on the engine block the testing lamp shall ignite. Make sure that the marks on the rotor and housing edge coincide and that the weights are in.
8. Turn off the ignition and remove the testing lamp. Clean and inspect the distributor cap, ignition cables, spark plugs and the terminals at the plugs and distributor cap.

INSPECTION AND MARKING OF IGNITION SETTING MARKS ON THE PULLEY

IMPORTANT

If the crankshaft or pulley have been replaced, the marking on the pulley will not agree.

The inspection or marking of the pulley is carried out as follows:

1. Fit the indicator gauge (tools 784040, 784060 and 784062) in the spark plug hole for the 2nd cylinder.
2. Turn over the crankshaft until the piston is at top dead centre, which can be ascertained with the indicator gauge.
3. The marking on the pulley shall coincide with the **upper** mark on the engine block. If it does not the old marking must be filed off and a new mark made, with a file.

IGNITION COIL AND IGNITION CABLES

There are two different makes of ignition coils; one with and one without an armoured cable to the ignition switch. The ignition coil is situated on the wheel valance, and is furnished with a pre-connection resistance to protect the coil at low engine speeds or when the engine is stationary with the ignition switched on.

The ignition cables are equipped with terminals at the plugs and distributor, to facilitate effective sealing. The terminals at the plug ends must have a breather hole. The holes are situated towards the radiator.

IMPORTANT

The cables may not lay nearer than about 10 mm (0.4 in.) to the casting at any one point.



SPARK PLUGS

The spark plugs, which are of the "Surface gap" type, have no side electrodes. The spark gap is the clearance between the centre electrode and the lower part of the plug body. It is thus not possible to adjust the spark gap. When the gap exceeds 1.2 mm (0.05 in.) the plugs must be changed.

IMPORTANT

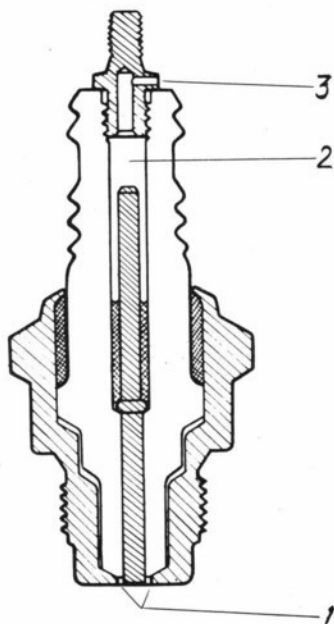
Conventional plugs may not be fitted as these can damage the engine. Champion plugs UK-16V are only sold by Saab agents.

The plug may not be ground or washed in gasoline or the like. When cleaning a wire brush can be used and the plug then blown clean with a jet of compressed air.

To obtain a spark with a greater effect the plug is equipped with a pre-spark gap inside the insulator. This area is ventilated through the screw for the cable connection. See the illustration. To prevent corrosion in the terminal, it is equipped with a breather hole, which faces backwards. The ignition voltage is relatively high, which places great demands on the fact that the distributor cap, ignition coil, ignition cables and plugs are kept clean. The ignition cables may at no point lie nearer than 10 mm (0.4 in.) to the casting.

IMPORTANT

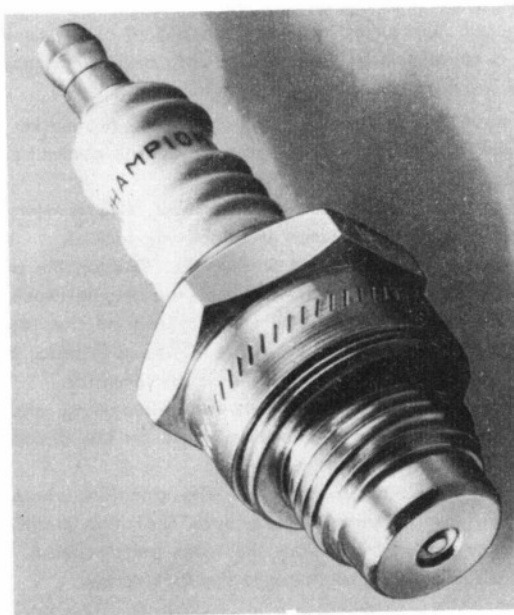
The tightening torque for the Champion UK-16V spark plug is 2 kpm (14.4 lbs./ft.).



S 151

Spark plug, Champion "Surface gap" type

1. Spark gap
2. Pre-spark gap
3. Breather hole



Spark plug

S 152



4. Cables and fuses

ELECTRICAL SYSTEM UP TO CHASSIS 168.000

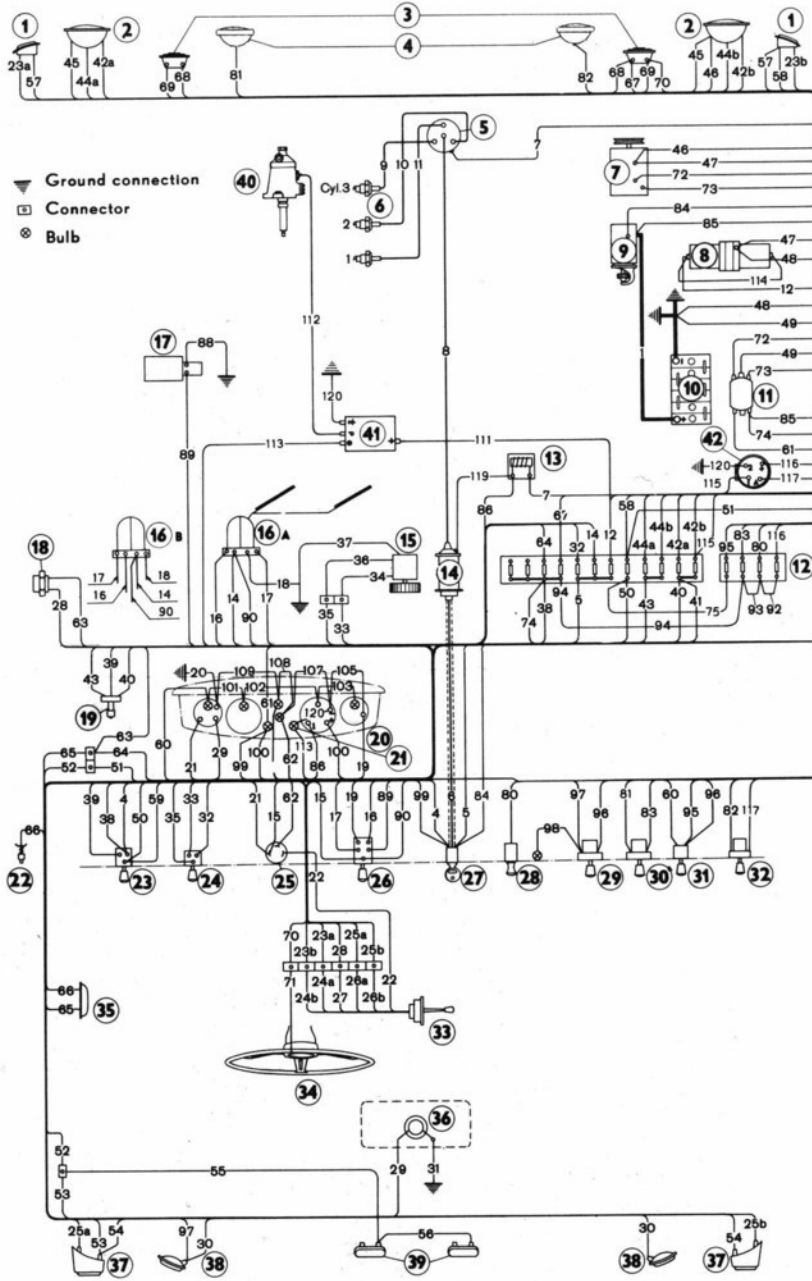
The electrical system for the Saab "Granturismo 850" (Saab 96 Sport) (up to chassis 168.000) is shown on the wiring diagram on the next page. The table below shows the colours of the various cables so that they can easily be identified.

Cable colours:

Black:	1, 7, 18, 19, 20, 23a, 24a, 32, 37, 45, 46, 47, 48, 49, 71, 80, 88, 89, 105, 107, 108, 109, 120, 122
Red:	5, 8, 9, 10, 11, 14, 15, 21, 27, 28, 33, 34, 39, 61, 63, 65, 67, 68, 72, 83, 86, 90, 111, 116
Yellow:	17, 25a, 26a, 43, 44b, 66, 73, 81, 84, 99, 100, 112
Green:	16, 22, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 75, 82, 101, 102, 103, 119
Blue:	42a, 62
Grey:	4, 12, 25b, 26b, 29, 35, 36, 38, 44a, 64, 69, 70, 74, 85, 92, 93, 94, 113, 114, 117
White:	23b, 24b, 30, 40, 41, 42b, 95, 96, 97, 98, 115

Legend of the circled figures on the wiring diagram

- | | |
|--------------------------------|---|
| 1. Parking lamps-flashers | 23. Lighting switch |
| 2. Headlamps | 24. Fan switch |
| 3. Horn | 25. Flasher relay |
| 4. Fog and spot lamps | 26. Windshield wiper switch |
| 5. Distributor | 27. Ignition and starter switch |
| 6. Spark plug | 28. Cigarette lighter |
| 7. Generator | 29. Switch for back-up lamp with warning lamp |
| 8. Fuel pump | 30. Switch for fog lamps |
| 9. Starter motor | 31. Instruments lighting switch |
| 10. Battery | 32. Switch for spot lamp |
| 11. Charging relay | 33. Direction indicator switch |
| 12. Fusebox | 34. Horn contact |
| 13. Resistance | 35. Interior lamp with switch |
| 14. Ignition coil | 36. Fuel gauge sender |
| 15. Fan motor | 37. Flasher and tail lamp |
| 16. Windshield wiper motor | 38. Back-up lamp |
| 17. Windshield washer pump | 39. Number plate illumination |
| 18. Brake contact | 40. Oil pressure warning sender |
| 19. Foot-dipper switch | 41. Oil pressure warning relay |
| 20. Instruments | 42. Search lamp relay |
| 21. Warning lamp, oil pressure | |
| 22. Door switch | |



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Wiring diagram up to chassis 168.000



ELECTRICAL SYSTEM FROM CHASSIS 168.001

The electrical system of the Saab "Granturismo 850" (Saab 96 Sport) is shown in the adjacent wiring diagram. The cable numbers refer to the following table, by which the various cables may be identified.

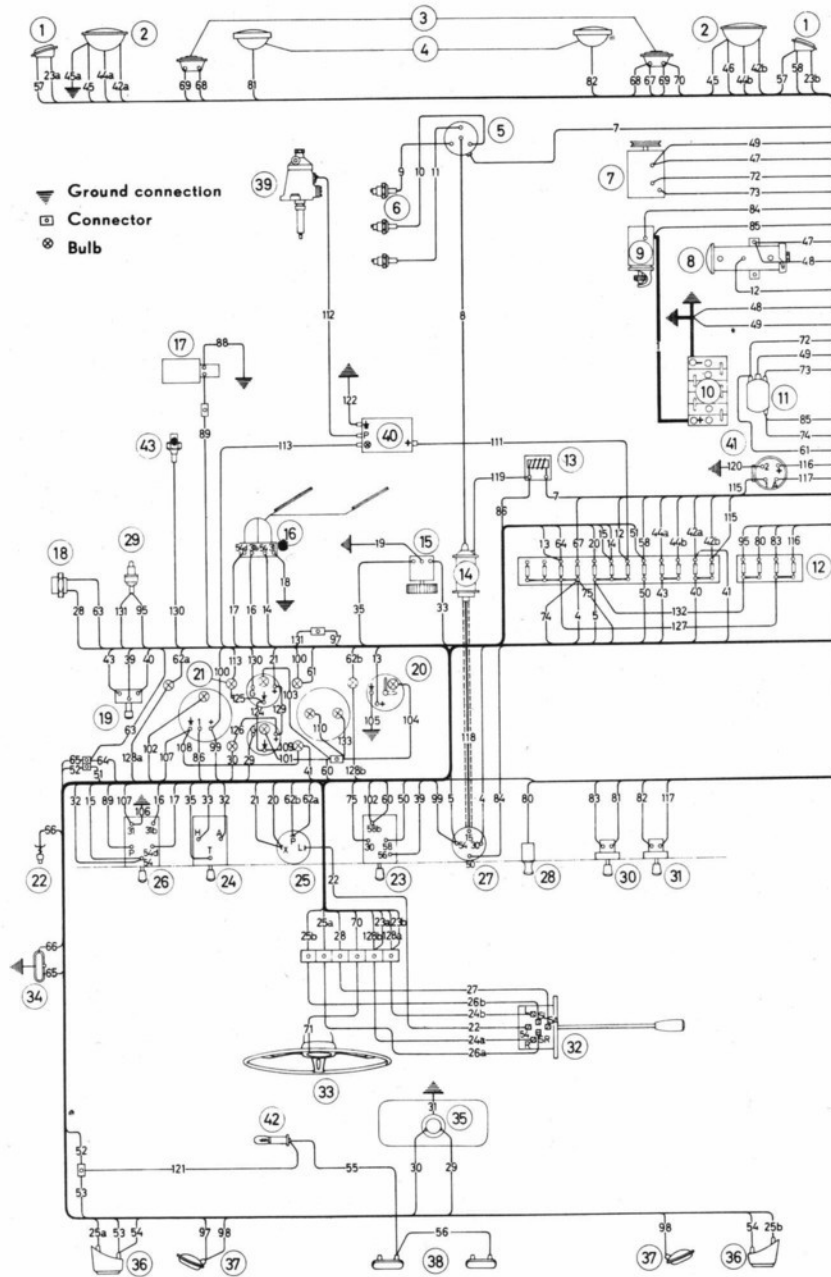
Cable insulation colors:

Black:	1, 7, 18, 19, 23a, 24a, 32, 45, 46, 47, 48, 49, 71, 80, 88, 105, 106, 107, 108, 109, 120, 122, 124, 125
Red:	5, 8, 9, 10, 11, 14, 15, 20, 21, 27, 28, 33, 39, 61, 63, 65, 67, 68, 72, 83, 86, 111, 116, 126, 129, 132
Yellow:	17, 25a, 26a, 30, 43, 44b, 66, 73, 81, 84, 99, 100, 112, 128b, 130
Green:	16, 22, 50, 51, 52, 53, 54, 55, 56, 57, 58, 60, 82, 101, 102, 103, 104, 110, 119, 133
Blue:	42a
Grey:	4, 12, 13, 25b, 26b, 29, 35, 44a, 62a, 62b, 64, 69, 70, 74, 75, 85, 89, 113, 117, 127
White:	23b, 24b, 40, 41, 42b, 95, 97, 98, 115, 128a, 131

Legend of the circled figures on the wiring diagram

1. Turn indicators and parking lamps
2. Headlights
3. Horns
4. Fog light and spot light
5. Distributor
6. Spark plugs
7. Generator
8. Fuel pump
9. Starter
10. Battery
11. Relay
12. Fuse box
13. Resistance
14. Ignition coil
15. Heater fan motor
16. Windshield wiper motor
17. Windshield washer pump
18. Stop light switch
19. Beam switch
20. Instrument unit
21. Oil pressure control light
22. Courtesy light switch
23. Headlight switch with panel light switch
24. Heater fan switch
25. Flasher unit
26. Windshield wiper switch
27. Ignition and starter switch
28. Cigarette lighter
29. Back-up light switch
30. Fog light switch
31. Spot light switch
32. Turn indicator switch
33. Horn push
34. Courtesy light with switch
35. Tank unit, fuel gauge
36. Turn indicators and tail lamps
37. Back-up light
38. License plate lights
39. Oil gauge
40. Relay, oil gauge
41. Relay, spot light
42. Luggage compartment light
43. Temperature meter

15 ELECTRICAL SYSTEM



Wiring diagram from chassis 168.001

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5. Oil pressure warning system

GENERAL

The oil pressure warning system consists of a sender, a relay and a warning lamp.

The task of the warning relay is to ignite the lamp on the instrument panel when an impulse is obtained from the sender on the pump showing that the engine lubrication system is not functioning.

The relay is composed of a box containing two bimetal relays, one for voltage control and one for the sending of signals. See the illustration.

The relay has a certain delay and requires a certain number of impulses from the pump before the lamp on the instrument panel goes out. This time can vary from 15 seconds to 1½ minutes, dependent on how the car is being driven. When driving a long time on low idling speed the lamp can flash. However this should disappear when the engine has run for a while above idling speed.

NOTE

The warning lamp can be alight up to 1½ minutes without there being something wrong with the lubrication system.

NOTE

It is not possible to make adjustments to the relay. If there is anything wrong with it, it must be replaced.

The warning relay is connected according to the wiring diagram in section 4.

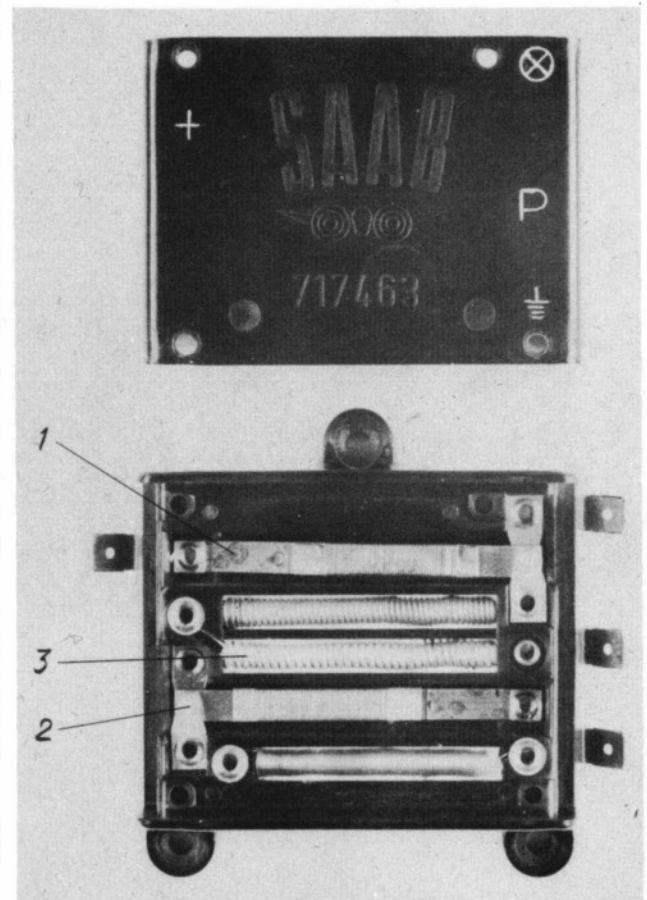
WARNING

Both the sender and the relay can be ruined if the cable from the sender is faultily connected to the relay. The cable shall be connected to "P".

INSPECTING THE OIL PRESSURE WARNING SYSTEM

Form a habit of checking that the system works properly periodically. This can be done with a watch with a second hand, as follows:

1. Turn the ignition key to the left, and see that all electrical appliances are turned off. The warning lamp should ignite immediately, and go out after 15—30 seconds.
2. After 1—1½ minutes, from the switch was turned, the lamp should ignite again.



Disassembled oil pressure warning relay S 157

1. Bimetal relay for warning lamp
2. Bimetal relay for voltage control
3. Resistance

15 ELECTRICAL SYSTEM



NOTE

The above only applies if the voltage between the relay connections for + and the casting is at least 12.5 V, i.e. the battery must be fully charged, no electrical appliances may be turned on and there must be no transitory resistance in the cables and terminals.

TROUBLE FINDING IN THE OIL PRESSURE WARNING SYSTEM

If the warning lamp does not operate as described above the following investigations must be made:

1. Disconnect the cable to the sender on the pump and reconnect to ground. Wait a minute or so, so that the

relay has time to cool and re-inspect as described above. If the warning lamp functions the fault is probably in the sender on the pump, which can be inspected according to Chapter 3 section 11.

2. Make sure that the fuse is alright and that the fuse holders have not oxidized.
3. Ascertain that the warning lamp is not faulty.
4. Make sure that the cables and connections are free of faults and that good contact is obtained.
5. If the oil pressure warning system still does not function satisfactorily, when re-inspecting according to above, the relay must be replaced.



CONTENTS

Section

1. LUBRICATING INSTRUCTIONS
2. SERVICE

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101





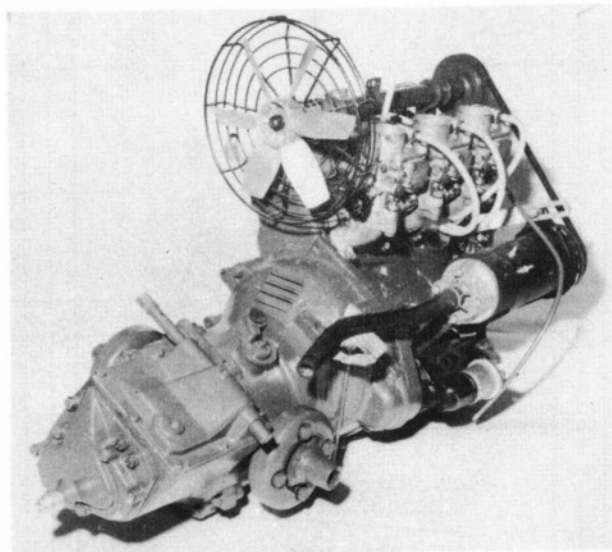
1. Lubricating instructions

GENERAL

The length of life of the car is greatly dependent on lubrication. Lubrication correctly carried out ensures that the car runs quietly and evenly and prevents unnatural wear to the moving parts. Each lubrication point must be lubricated regularly with first-class lubricant. The lubrication chart and lubrication table show where the points are located and recommends certain lubricants. The usual intervals between lubrication are divided up between stretches of 1,500 km (1,000 miles), 3,000 km (2,000 miles),

and 12,000 km (8,000 miles). As well as these there are a few points which shall be lubricated every 25,000 km (15,000 miles) and 50,000 km (30,000 miles), such as wheel bearings, etc.

When lubricating, and with other work, cleanliness is imperative, so that the body and equipment are not spotted with grease. When greasing the ball joints on the front end, the car should be blocked up so that the wheels hang freely.

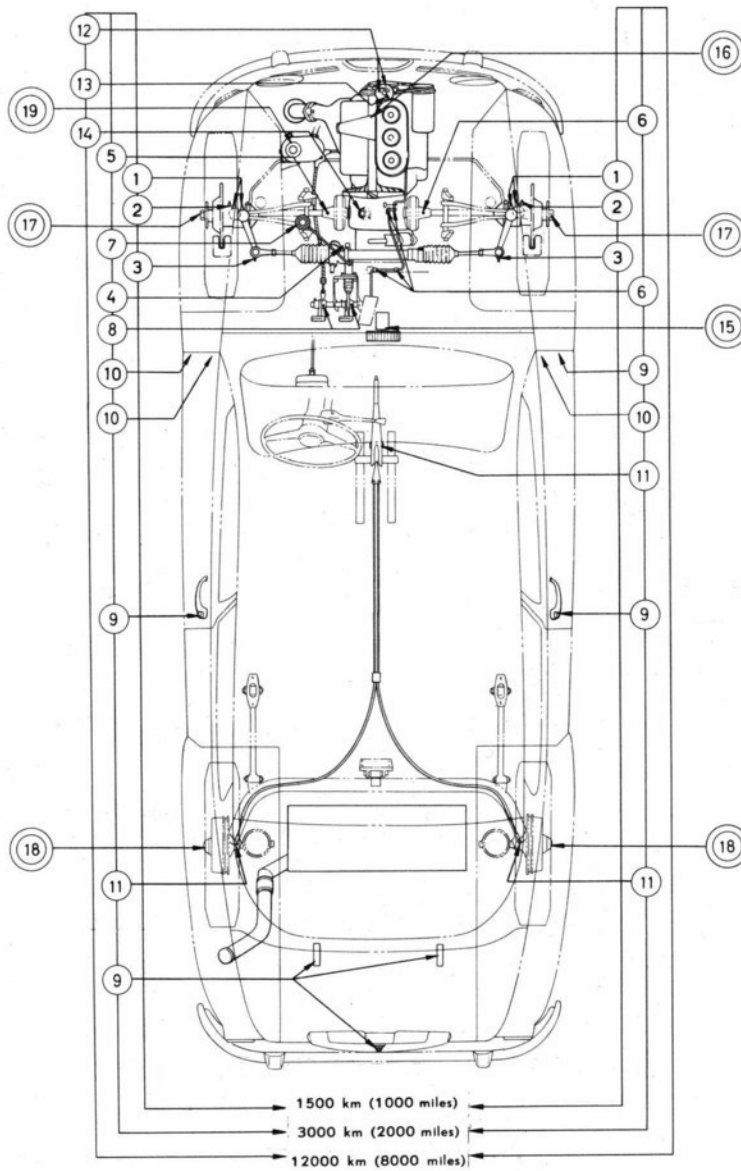


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Power unit



LUBRICATING CHART SAAB "GRANTURISMO 850" (SAAB-96 SPORT)





LUBRICATION TABLE SAAB 'GRANTURISMO 850' (SAAB 96 SPORT)

INTERVAL			REF.	DESCRIPTION	No. ON CAR	LUBRICANT	METHOD OF APPLICATION	QUANTITY REMARKS
1000 M. (1500 KM)	2000 M. (3000 KM)	8000 M. (12000 KM)						
×			1	Upper and lower ball joints, l. and r.	4	Universal or chassis grease	Grease gun	
×			2	Outer universal joint l. and r.	2	.	.	
×			3	Tie-rod ends, l. and r.	2	.	.	
	×		4	Steering gear	1	Universal or chassis grease OR COLD-RESISTANT GREASE AT VERY LOW TEMPERATURES SAE 40 OIL MAY BE ADDED	.	
	×		5	Inner drive shafts l. and r.	2	Oil, SAE 40	Oil can	
	×		6	Throttle linkage	5	.	.	
	×		7	Brake system	4	Lockheed HD 328. Disc brake fluid or equal detoliment SAE 70 R 3	Replenish	
	×		8	Pedals and clutch cable	4	Oil, SAE 40	Oil can	
	×		9	Hinges and locks	9	.	.	
	×		10	Door checks	4	Vaseline	Finger tip	
	×		11	Handbrake linkage	3	Oil, SAE 40	Oil can	
	×		12	Distributor shaft	2	.	.	
		×	13	Breaker cam assy.	1	Bosch Ft 1-v-4 grease	Smear into felt wick	
	×		14	Transmission case	1	EP oil, SAE 80	Check	
		×	14	.	1	.	Change	2 1/2 pints (1.4 liters) MAKE FIRST CHANGE AT 1500 - 2000 M. (2500 - 3000 KM)
Approx 15.000 m. (25.000 KM)			15	Heater fan shaft bearings	2	Oil, SAE 40	Oil can with heater motor removed	A FEW DROPS ONLY.
30.000 m. (50.000 KM)			16	Rad. fan shaft bearings	2	Universal or ball-bearing grease	Pack	
.			17	Front wheel bearings l. and r.	2	.	.	
.			18	Rear wheel bearings, l. and r.	2	.	.	
When refilling fuel tank			19	Engine. Oil tank under engine hood	1	Two-stroke oil SAE 30-40. Also self-mixing. (IF TWO-STROKE OIL IS NOT AVAILABLE HD GRADE MOTOR OILS SAE 30-40 MAY BE USED). WINTERTIME BELOW 10° C 14° F SELF-MIXING TWO-STROKE OIL MUST BE USED. NOTE: MULTIGRADE OILS WITH VISCOSITY SAE 10 W-30 IS NOT ALLOWED.	Check. Replenish oil tank	Oil tank capacity approx. 3 liters (0.8 US gal.)



DIFFERENCE FROM THE SAAB 96

The lubrication intervals and points are the same as on the Saab 96, with the following exceptions.

DISTRIBUTOR GEAR

The distributor gear has no lubricating nipple, and is lubricated automatically from the oil pump. If the engine is disassembled, however, 50 cm³ (3 cu.in.) of oil must be poured into the distributor gear housing.

ENGINE

The Saab 96 Sport is separately lubricated which means that only gasoline shall be filled into the fuel tank. Premium fuel of at least 95 octane shall be used. Oil is filled into a tank in the engine housing. This tank contains about 3 litres (0.8 US gal.), which is sufficient for at least 1,500 km (1,000 miles) of normal running.

The following oils are recommended:

Warm climate: Two-stroke oil SAE 30—40 (also self-mixing).
If there is no two-stroke oil available HD oil SAE 30—40 can be used.

Cold climate with an exterior temperature of less than —10° C:

Self-mixing two-stroke oil, e.g. oil which has been diluted by the manufacturer.

If the car is left outside in cold climates where the temperatures are less than —10° C the oil can become so thick that the oil pump cannot operate satisfactorily. This risk is eliminated if the oil is self-mixing. NB. Multigrade oils with a viscosity of SAE 10W—30 may not be used.



2. SERVICE

GENERAL

The delivery and service inspections specified in the Saab 96 handbook also apply for the Saab 96 Sport, with the following exceptions and additions

SPARK PLUGS

The spark gap cannot be adjusted. Inspect and clean with a wire brush and compressed air. When the spark gap exceeds 1.2 mm (0.05 in.) the plugs must be changed.

ADJUSTING THE IDLING

The idling speed can only be adjusted in conjunction with the synchronization of the carburetors, which requires access to a "Synchro-Test". See Chapter 6, section 4.

INSPECTING THE OIL PRESSURE WARNING UNIT

Make sure that the sender and relay function properly each time the car is serviced. See Chapter 15, section 5.

FUEL PUMP

If the car is equipped with a Bendix fuel pump, only the filter shall be cleaned.





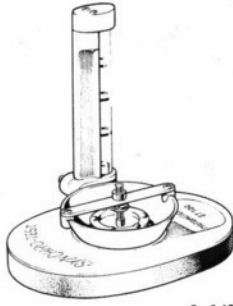


1. SPECIAL TOOLS

GENERAL

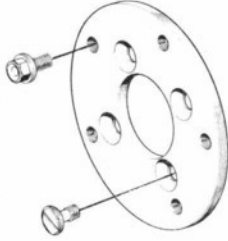
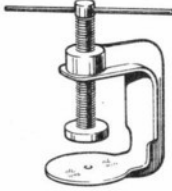
The following tools are required for the Saab "Granturismo 850" (Saab 96 Sport,) over and above the tools necessary for the Saab 96.

SPECIAL TOOLS FOR ENGINE

Part and Tool No.	Name	Degree of necessity			Illustration	Notes
		1	2	3		
784127	Ring for outer cap	1			 S 158	
724128	Crank for oil pump	1			 S 159	
784131	Synchro-Test	1			 S 160	



SPECIAL TOOLS FOR CHASSIS

Part and Tool No.	Name	Degree of necessity			Illustration	Notes
		1	2	3		
784129	Centre ring for wheel puller	1			 <p>S 161</p>	SPARE PART SPARE PART
784130 706155	SCREW FOR 784129. 4 PCS. WHEEL SCREW FOR 784129. 5 PCS.					
784132	Screw clamp for brake piston		2		 <p>S 162</p>	