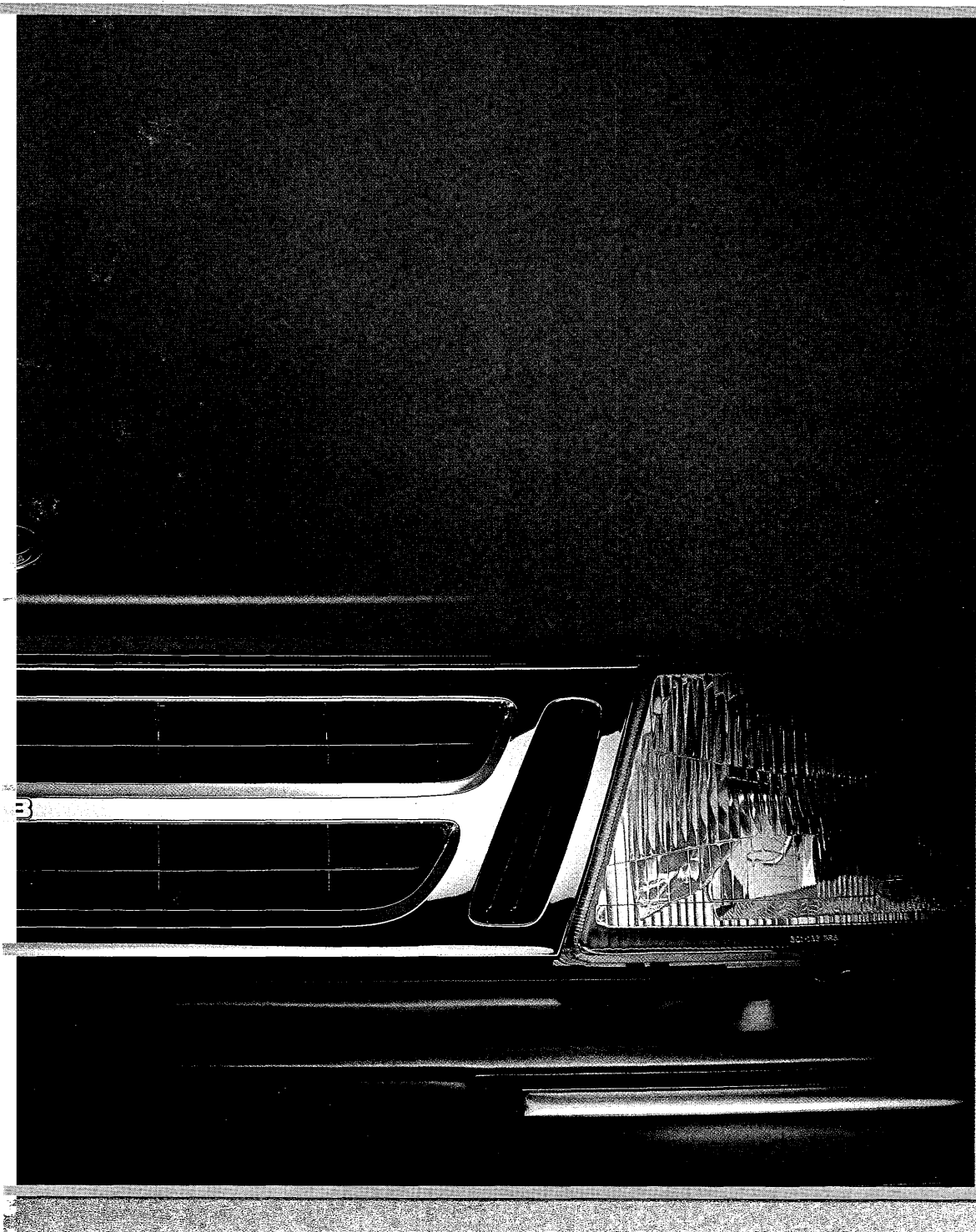


Saab 9000

SERVICE MANUAL



SAAB

I:2 Service

M 1986 - 88

SAAB



SERVICE MANUAL

1:2 Service

M 1986, 1987, 1988

1 General

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Units

The basic units as well as the derived units used throughout the Service Manual are in accordance with the SI system.

As a supplement to these, a number of other units are specified within brackets.

The following symbols for the various units have been used in this issue:

SI unit	Supplementary unit
mm	in
kg	lb
N	lbf
Nm	lbf ft
bar	psi
l	qt (US)
°C	°F

Conversion factors

1 in = 25,4 mm	1 mm = 0.039 in
1 lbf = 4,45 N	1 N = 0,23 lbf
1 lbf ft = 1,36 Nm	1 Nm = 0,74 lbf ft
1 psi = 0,07 bar	1 bar = 14,5 psi
1 qt = 0,95 l	1 l = 1,05 qt

Market codes

The codes refer to market specifications

AT	Austria	FR	France
AU	Australia	GB	Great Britain
BE	Belgium	GR	Greece
CA	Canada	IS	Iceland
CH	Switzerland	IT	Italy
DE	Germany	JP	Japan
DK	Denmark	ME	Middle East
ES	Spain	NL	Netherlands
EU	Europe	NO	Norway
FE	Far East	SE	Sweden
FI	Finland	US	USA

General

A clean and orderly workshop is an essential condition for good, professional work. Certain components of the car must also be handled carefully and protected from dirt and grit. For mechanics who are new to the job (and as a reminder to experienced mechanics) the following guidelines should be followed.

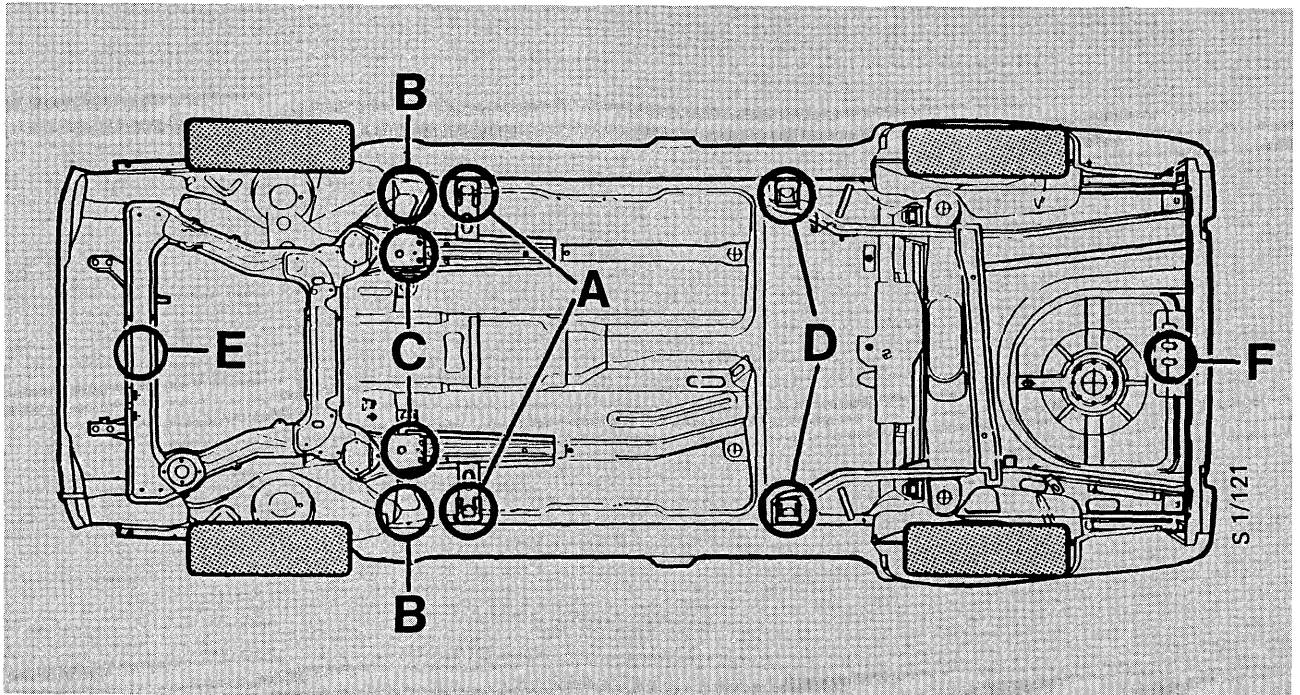
- 1 Cover the wings and other parts of the paintwork where you are working to avoid chipping and scratching.
- 2 Protect the upholstery with a suitable plastic covering to keep it clean.
- 3 Before starting to dismantle hubs, shafts, etc., remove all loose dirt from the insides of the surrounding body panels and from around the rear axle. This will help to prevent dirt and grit from entering bearings and other sensitive components, as well as to make the work that much easier.
- 4 Thoroughly clean the recess in the cylinder head before removing a spark plug.
- 5 The workshop should have special areas set aside for different jobs. For instance, a workbench on which an engine or gearbox is to be disassembled should never be used for filing or the like.

Lifting and jacking up the car

To avoid damaging the car, jacks and car lifts should only be applied at suitable points. Two jacking points are provided on either side of the car to enable one side of the car to be jacked up, for instance, for changing a wheel. The engine compartment floor is reinforced immediately under the cross-member supporting the engine for the application of a trolley jack. A similar reinforced jacking point is provided under the floor panel behind the fuel tank at the rear of the car. On most trolley jacks, the pad or head is of channel-section design; to prevent damage to the floor of the car, therefore, a block of wood should be placed between the jack and the car. For jobs requiring either the front or the rear of the car to be raised, the jacking points under the sills should be used.

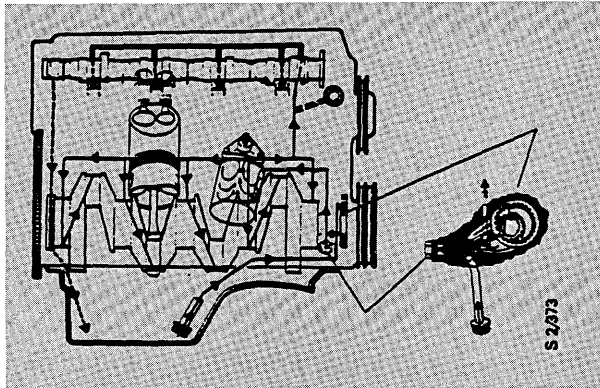
Application points

- A Front jack attachments and application points for hoist
- B and C Alternate front application points for hoist
- D Rear jack attachments and application points for hoist
- E Front application point for trolley jack
- F Rear application point for trolley jack



Technical data

Engine



Lubricating system

Oil capacity including oil filter	liter (qts)	4.2 (4.5) Oil capacity of empty oil cooler 0.5 liter
Volume of oil required to raise oil level from MIN mark on dipstick to MAX mark	liter (qts)	1.0 (1.05)
Grade of oil, Turbo		Saab Turbo engine oil or oil to API Service SF/CD or SF/CC
Viscosity		10W30 or 15W40. At temperatures below -20°C (-4°F) 5W20 should be used

Full-load enrichment system

Throttle switch (butterfly angle when switch closes)	degrees (°)	Approx. 72
CO value at simulated full load conditions	%	4 - 6

Induction and exhaust systems

Turbo compressor

Maximum charging pressure	bar (psi)	0.85 ± 0.05 (12.4 ± 0.72)
Basic charging pressure	bar (psi)	0.35 ± 0.03 (5.1 ± 0.43)
Tripping pressure for pressure switch	bar (psi)	1.10 ± 0.05 (16.0 ± 0.72)
Turbo shaft bearings:		
End float	mm (in)	0.025 - 0.10 (0.001 - 0.004)
Radial clearance	mm (in)	0.075 - 0.18 (0.0029 - 0.007)

4 Technical data

Mechanical throttle damper (dashpot)

Engine not running: Time taken for lever to move from contact position (lever- damper) to idling position	sec	4 ± 1
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Cooling system

Coolant

Type		Saab Original Coolant P/N 02-08-991
Capacity	liter (qts)	10 (10.5)

Thermostat

Opening temperature	°C (°F)	89 ± 2 (192 ± 4)
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Expansion tank

Pressure valve opens at	bar (psi)	0.9 - 1.2 (13 - 17.5)
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Thermostatic switch

Makes circuit at	°C (°F)	90 - 95 (194 - 203)
Breaks circuit at	°C (°F)	85 - 90 (185 - 194)

Engine performance graph

Ignition system

Type	Breakerless incorporating a Hall transducer
Firing order	1-3-4-2

Ignition setting with vacuum control unit disconnected

Engine 16-valve	Timing at r/min
Turbo	16° BTDC/850
Non Turbo	14° BTDC/850

Spark plugs

Engine 16-valve	Normal driving	City driving
	NGK BCP 7EV NGK BCP 7ES	NGK BCP 6EV NGK BCP 6ES
Non-Turbo	NGK BCP 6ES NGK BCP 6EV	

Electrode gap	mm (in)	0.6 (0.023)
Tightening torque (non-lubricated plug)	Nm (lbf ft)	25-29(18.5-21.5)

Belt tension

		Alternator	AC
New belt	N (lbf)	800 ± 45 (180 ± 10)	535 ± 45 (120 ± 10)
Minimum	N (lbf)	355 (80)	265 (60)
After adjusting	N (lbf)	535 ± 45 (120 ± 10)	355 ± 20 (80 ± 5)

Tightening torques

Cylinder head bolts	Nm (lbf ft)	80 (60) then tighten down a further quarter-turn (90°)
Exhaust manifold to cylinder head	Nm (lbf ft)	25 (18)
Intake manifold to cylinder head	Nm (lbf ft)	18 (13)

Transmission

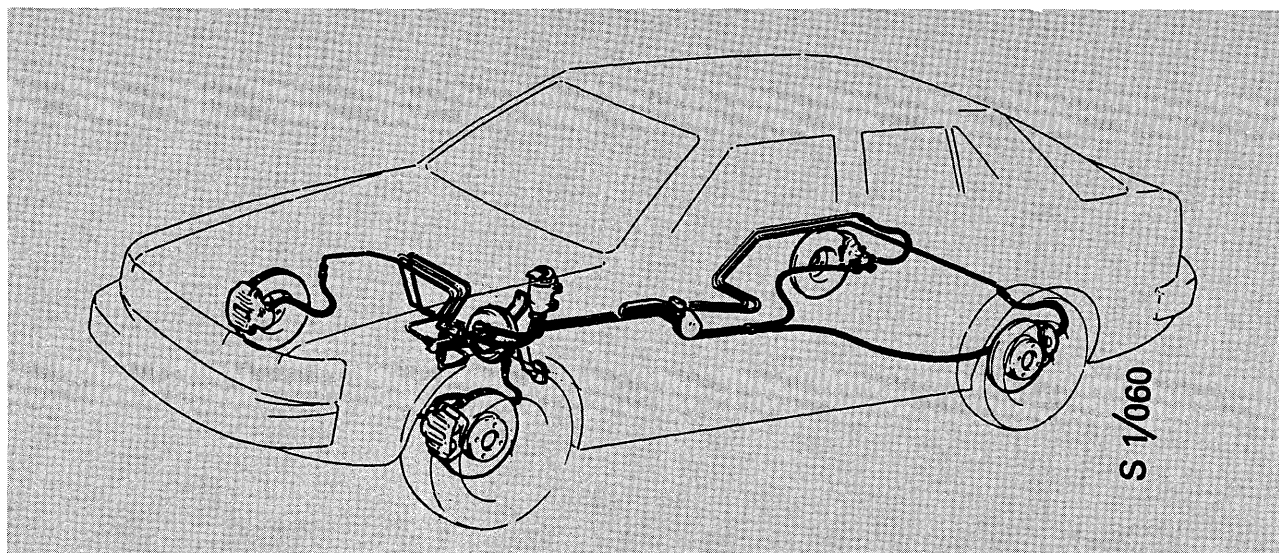
Manual gearbox

Oil capacity	l (qts)	2.5 (2.65)
Grade of oil		Engine oil SAE 10W30 or 10W40
Weight including oil	kg (lb)	47 (102)

Automatic gearbox

Oil capacity	l (qts.)	8.2 (8.6)
Oil type		Dexron II
Gearbox Weight, dry, without con.	kg (lbf)	57 (125)

Brakes



Front brakes

Make			Girling
Type			Sliding caliper and ventilated discs
Brake disc:	Outside diameter	mm (in)	280 (11.032)
	Thickness, new disc	mm (in)	22 +0/-0,2 (0.866 +0/-0.008)
	Minimum thickness after grinding	mm (in)	20 (0.787)
	Maximum grinding depth each side	mm (in)	1 (0.039)
	Maximum runout, disc fitted	mm (in)	0.08 (0.0031)
	Maximum variation in disc thickness	mm (in)	0.015 (0.0006)
Brake pads:	Thickness of new lining	mm (in)	11 (0.433)
	Minimum thickness	mm (in)	1 (0.039)
	Area of friction material, each pad	cm ² (in ²)	35 (5.42)

Rear brakes

Make	ATE		
Type	Sliding caliper		
Brake disc,	Outside diameter	mm (in)	258 (10.157)
	Thickness, new disc	mm (in)	9.0 ± 0.1 (0.354 ± 0.004)
	Minimum thickness after grinding	mm (in)	7.5 (0.295)
	Maximum grinding depth each side	mm (in)	0.75 (0.029)
	Maximum runout, disc fitted	mm (in)	0.08 (0.0031)
	Maximum variation in disc thickness	mm (in)	0.015 (0.0006)
Brake pads,	Thickness of new lining	mm (in)	11 (0.433)
	Minimum thickness	mm (in)	1 (0.039)
	Area of friction material, each pad	cm ² (in ²)	18.4 (2.85)
Total area of friction material, front and rear brakes	cm ² (in ²)	212 (32.86)	

Brake fluid

Grade	DOT 4	
Fluid capacity	l	Approx 0.50

Front assembly, steering device
Front wheel alignment (unladen car)

Swivel pin (king pin) inclination	degrees	11.3 ± 0.5
Castor	degrees	1.65 ± 0.50
Camber	degrees	-0.65 ± 0.50
Toe-in, measured at rim (410 mm or 16.1 in)	mm (in)	1.5 ± 1 (0.06 ± 0.04)
Toe-in, measured at a universal 28.64 in circle	mm (in)	2.6 ± 1.7 (0.102 ± 0.067)
Steering angle, outer wheel	degrees	20
Steering angle, inner wheel	degrees	21 ± 0.5
Slip radius 195/60 HR 15/6 in rim	mm (in)	3 (0.118)

8 Technical data

Rear wheel alignment

Toe-in, measured at rim (410 mm or 16.1 in)	mm (in)	2.5 ± 1.5 (0.098 ± 0.059) 1-3 (0.04 - 0.12)/side
Toe-in measured at a universal 28.64 in circle	mm (in)	4.4 ± 2.6 (0.173 ± 0.102)
Camber	degrees	-0.25 ± 0.25

Steering

Permissible wear limits

Track-rod end,	Axial play	mm (in)	2 (0.08)
	Radial play	mm (in)	1 (0.04)
Inner ball joint, rack- and-pinion gear,	Axial play	mm (in)	1 (0.04)
Ball joints (track-rod ends)	Non-adjustable. If excessive play is present, the ball joint must be replaced complete.		

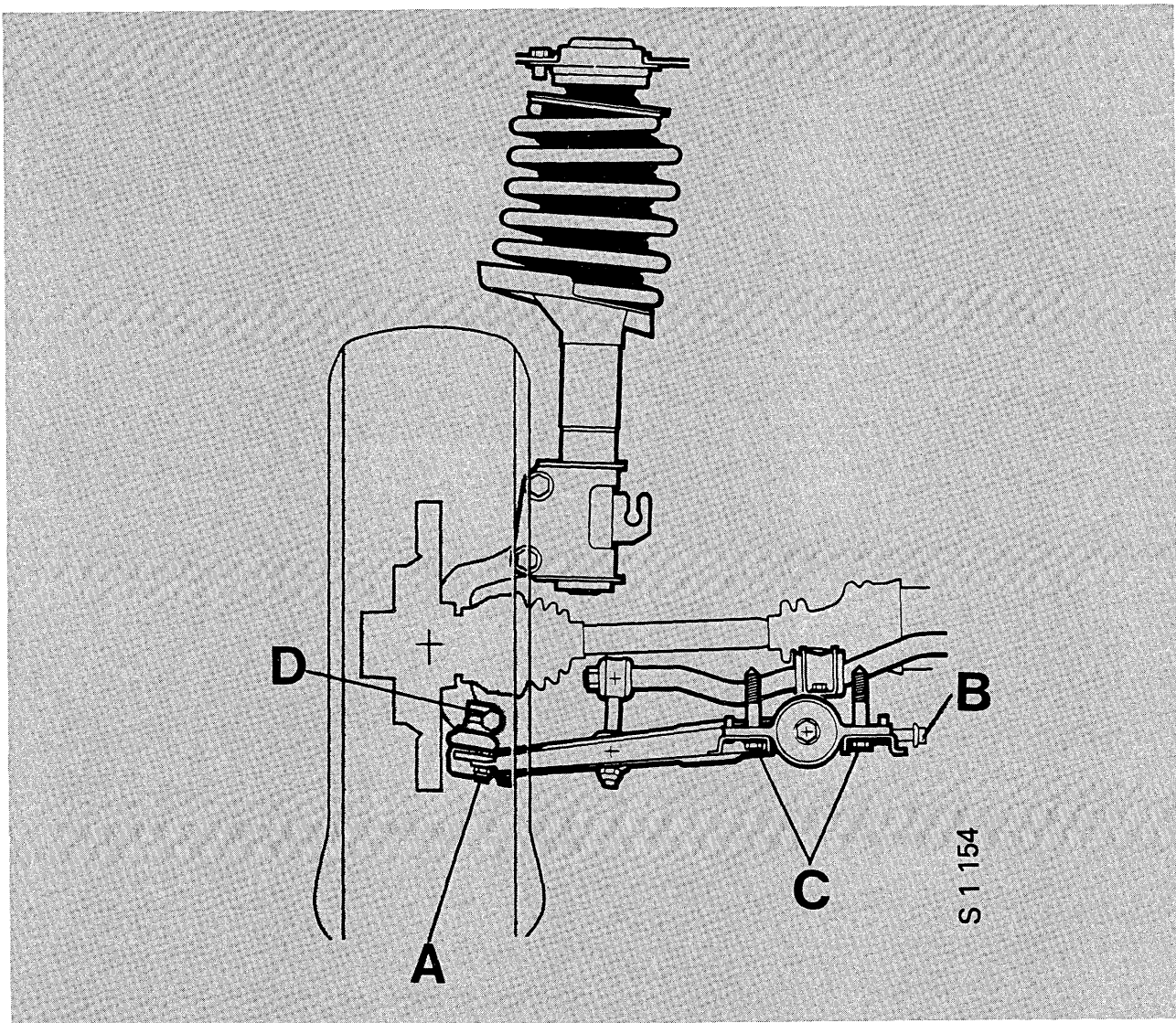
Track-rod ends

Maximum distance between the lock nut and the outer edge of the groove on the track rod	mm (in)	140 (5.51) max.
Maximum difference in above dimensions between left and right track rods	mm (in)	2 (0.08)

Retightening the front assembly joints

Check the following mountings:

- A Wishbone ball joint to wishbone 25 - 34 Nm
(18 - 25 lbf ft)
- B Wishbone bush to sub-frame 45 - 54 Nm
(33 - 40 lbf ft)
- C Sub-frame to body 42 - 57 Nm (31 - 42 lbf ft)
- D Suspension arm ball joint - steering knuckle
housing: 42 - 57 Nm (31 - 42 lbf ft).



S 1 154

Check-tighten the rear-axle mountings

Check-tighten all the fixing points as shown.

Tightening torques:

- A Spring link to body: 42 - 57 Nm (31 - 42 lbf ft)
- B Torque arm to body: 20 - 27 Nm (15 - 20 lbf ft)
- C Panhard rod-body M10 47 - 54 Nm (35 - 40 lbf ft)
M12 84 - 96 Nm (62 - 71 lbf ft)
- D Stay between rear axle and body, M12: 84 - 96 Nm (62 - 71 lbf ft)

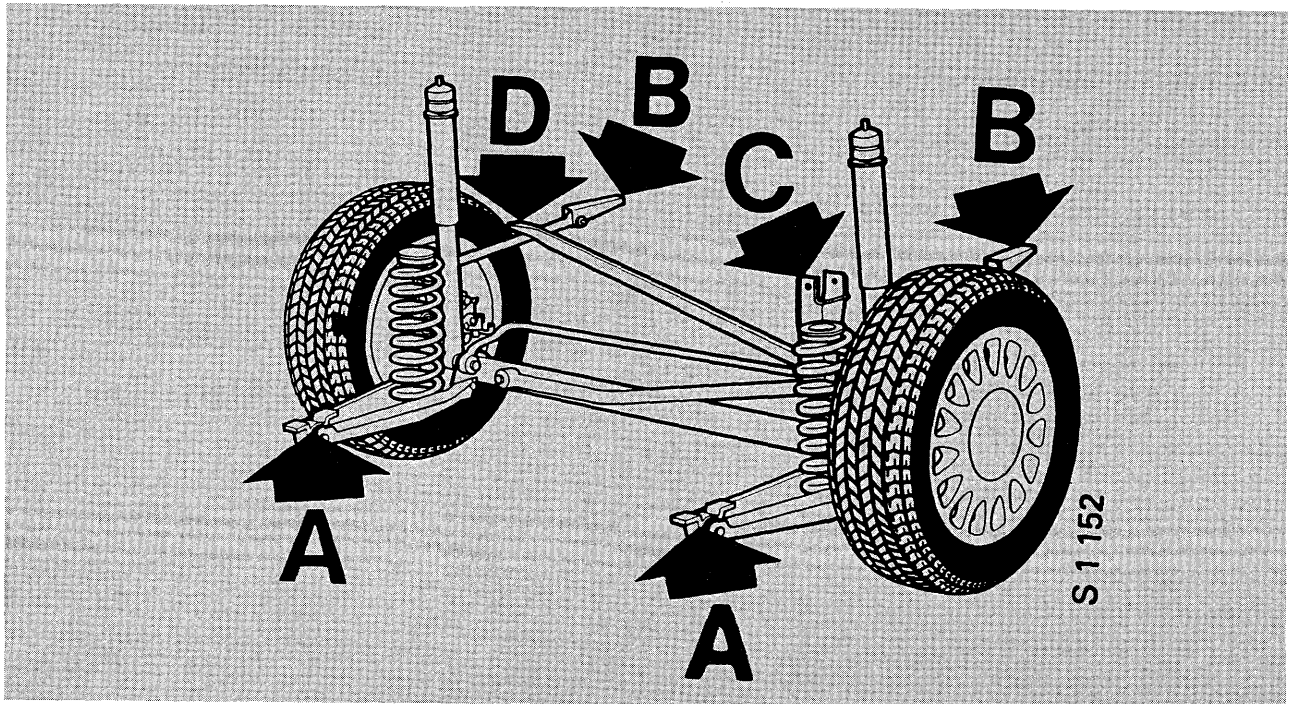


Table of recommended tire pressures (cold tyres)

Tire	Load, occupants	Speed, km/h (mph)	Tire pressures	
			Front Bar (psi)	Rear Bar (psi)
185/65 R15 87T	1-3	0-190 (0-118)	2.2 (32)	2.2 (32)
	4-5		2.6 (38)	2.6 (38)
185/65 R15 87H	1-3	0-190 (0-118)	2.2 (32)	2.2 (32)
	4-5		2.6 (38)	2.6 (38)
195/60 R15 86H	1-3	0-210 (0-130)	2.2 (32)	2.2 (32)
	4-5		2.6 (38)	2.6 (38)
195/60 R15 87H	1-3	0-210 (0-130)	2.2 (32)	2.2 (32)
	4-5		2.6 (38)	2.6 (38)
195/60 VR15	1-3	0-210 (0-130)	2.2 (32)	2.2 (32)
	1-3	>210 (>130)	2.6 (38)	2.6 (38)
	4-5		2.6 (38)	2.6 (38)
205/55 VR15	1-3	0-210 (0-130)	2.1 (30)	2.1 (30)
	1-3	>210 (>130)	2.5 (36)	2.5 (36)
	4-5		2.5 (36)	2.5 (36)
Winter tires				
175/70 R15	1-3		2.3 (33)	2.4 (35)
	4-5		2.4 (35)	2.4 (35)
185/65 R15	1-3		2.2 (32)	2.2 (32)
	4-5		2.3 (33)	2.3 (33)
Spare tires				
T115/70 D15/ or R15			4.2 (60)	
Accessory tires				
205/50 VR16	1-3	0-210 (0-130)	2.1 (30)	2.1 (30)
	1-3	>210 (>130)	2.5 (36)	2.5 (36)
	4-5		2.5 (36)	2.5 (36)
205/55 VR16	1-3	0-210 (0-130)	2.0 (29)	2.0 (29)
	1-3	>210 (>130)	2.4 (35)	2.4 (35)
	4-5		2.4 (35)	2.4 (35)
Wheel bolts		Nm (lbf ft)	105–125 (76–90)	
Hubs, front wheels		Nm (lbf ft)	270–290 (194–208)	
rear wheels		Nm (lbf ft)	270–290 (194–208)	

Maintenance program

Maintenance schedule Saab 9000 1986, 1987, 1988

The Emission System Maintenance instructions specify operations to ensure proper and safe function of Saab emission control systems throughout the useful life of the automobile. Additional maintenance is specified for certain components when operated under certain severe conditions. Maintenance, replacement, or repair of the emission control devices and systems may be performed by any automotive repair establishment or individual using any automotive part which has been certified according to U.S. EPA regulations governing voluntary after-market part self-certification.

Service record retention

Service coupons and record stubs are provided in the Saab 9000 Warranties/Service Record booklet.

The coupons are arranged in the order that service should be performed. The edge of each coupon is shaded to correspond to the type of service point: Striped - Break in Service; Lt. Gray - Intermediate Oil and Filter Change; Dk. Gray - Oil Change/Safety Inspection; Black - Major Service. Two coupons are provided at the end for two free inspections required to validate the Perforation Warranty.

When scheduled services are performed your dealer will tear out the applicable coupon, check off the operations performed and enter it into the service file at the dealership. The servicing dealer's stamp, along with date and mileage at which the service was performed, should be entered on the coupon stub which remains in your booklet. This is your permanent record that recommended maintenance has been performed.

Authorized Saab dealers regularly receive up-to-date Service Manuals and bulletins from Saab-Scania of America, Inc. and are able, through their franchise agreement with Saab-Scania of America Inc., to attend Saab service schools and purchase special tools and original equipment spare parts. Authorized Saab dealers are equipped and trained to meet your Saab service needs.

Checklist oilchange safety inspection

NOTE: Sample checklist shown. Use checklist supplied in the vehicle Warranties/Service Records Booklet for applicable list.

A. EMISSION SYSTEM MAINTENANCE

- Engine Oil and Oil Filter—Change.

B. VEHICLE MAINTENANCE

ENGINE

- Cooling System—Check condition. Check coolant level and anti-freeze content.
- Fuel Injection System Safety Check—Visually check condition.
- Exhaust System—Check condition.

Additional inspection for vehicles operated under severe service conditions including extensive idling, stop and go driving, towing, high speed driving and/or driving in cold climates over repeated short trips without sufficient engine warm up:

Interval: Every 15,000 mile if operated according to above conditions.

- Spark Plugs — Check and regap or replace as necessary.

MANUAL TRANSMISSION

- Gearbox Oil Level—Check/add.

AUTOMATIC TRANSMISSION

- Gearbox Oil Level—Check/add.
- Differential Oil Level—Check/add. [900 only]

ELECTRICAL SYSTEM

- Battery—Check terminal connections.
- Functional Check—Lamps, electrical equipment and accessories.

CHASSIS

- Toe-In—Check/adjust.

- Tires—Check condition and rotate tires front to rear, same side.
- Power Steering Fluid—Check/add.
- General Inspection—Check underside for damage. Check rubber boots for drive shaft joints, ball joints and tie-rod ends.
- Brake System—Check component condition.
- Power Brake Vacuum Servo—Check hose for leaks.
- Hand Brake—Check function.
- Brake Pads—Check lining thickness (while tires are off).
- Brake Fluid—Check level.

MISCELLANEOUS

- Test Drive Vehicle—Check overall condition, noting especially the function of brakes and clutch. Check general engine performance.

Oil change/safety inspection

To be carried out every 7,500 mile (12,000 km) or 12 months.

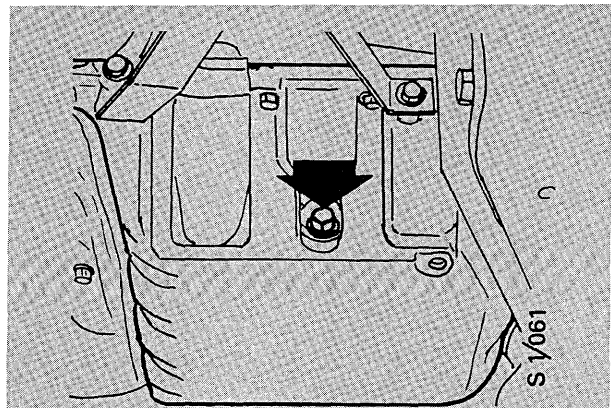
Emission system maintenance

Engine oil and oil filter - change.

Oil capacity: 4.2 liters (4.5 qts)

Use only oil which meets API-Service SF/CD or SF/CC and SAE viscosity ratings listed below.

Above 0°F (-17°C)	SAE 10W-30 or 15W-40
Below 0°F (-17°C)	SAE 5W-30

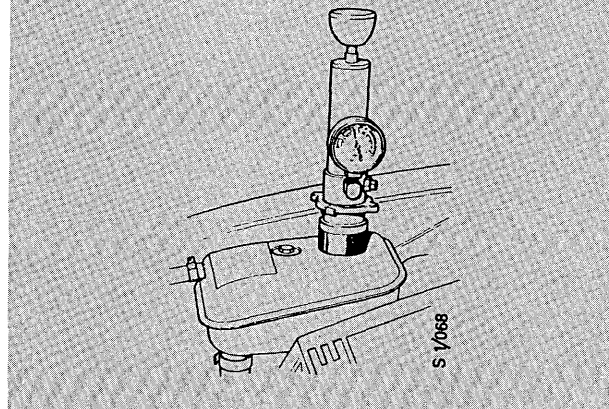


Vehicle maintenance

Engine

Cooling system - check

Check hoses and connections for leaks. Tighten clamps or replace clamps or hoses if necessary. Check coolant level and anti-freeze content.



Fuel injection system - check

Visually check condition on fuel lines and connections.

Exhaust system - check

Check for leakage and ensure that all fasteners and hangers are secure. Correct as necessary.

Spark plugs - check

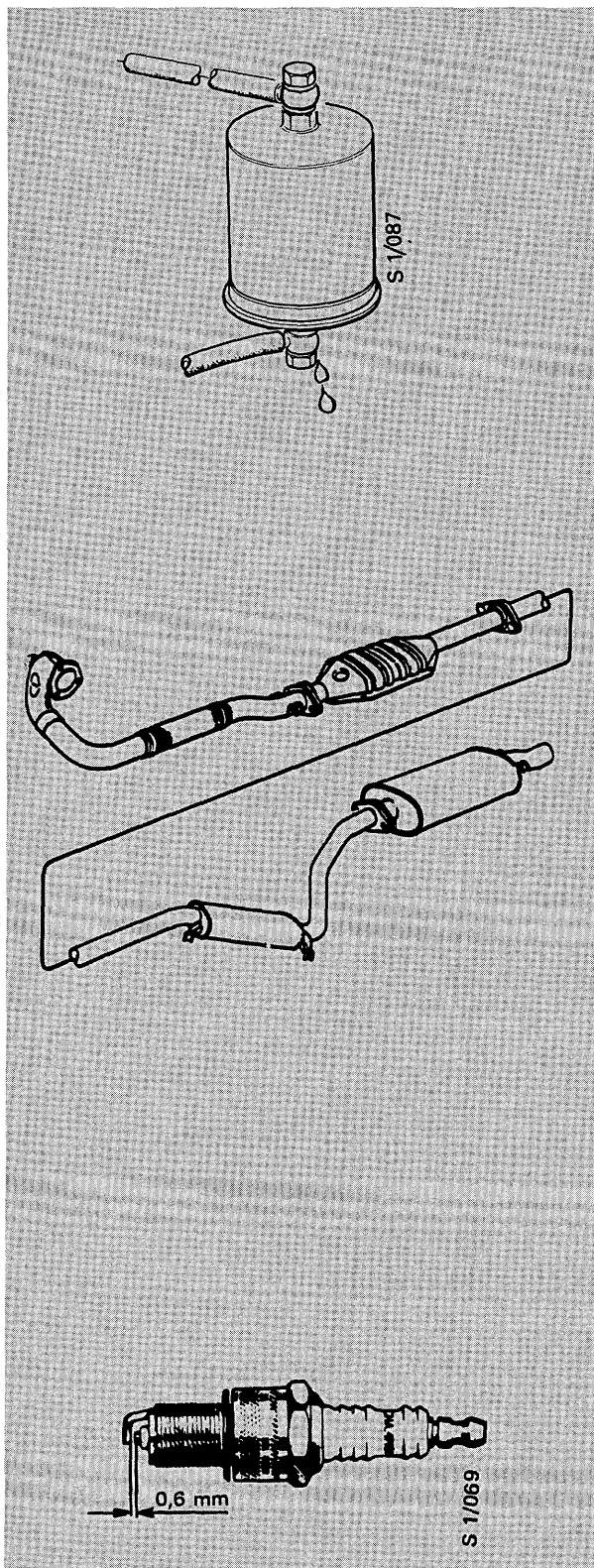
Check and regap or replace as necessary at 15,000 mile intervals if the vehicle is used in Severe Service. This is described as extensive idling, stop-and-go driving and driving in cold climates on repeated short trips without sufficient engine warm-up.

Beginning with 1988 models, Federal Regulations state that the spark plugs may not be inspected or replaced before 30,000 miles. Beginning with the 60,000 Major Service the plugs may be inspected, cleaned, regapped or replaced at intervals of 15,000 miles.

Do **not** use heat ranges that are not recommended by Saab.

Engine	Normal driving	City driving
Turbo	NGK BCP 7EV	NGK BCP 6EV
	NGK BCP 7ES	NGK BCP 6ES
Non-Turbo	NGK BCP 6ES	
	NGK BCP 6EV	

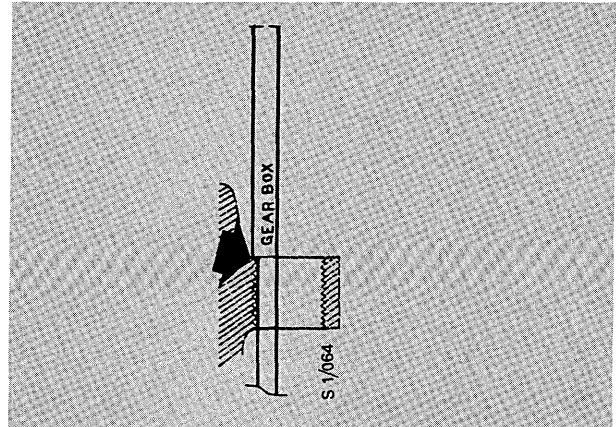
Electrode gap: 0.6 mm (0.024 in)
 Tightening torque: 25-29 Nm
 (18.5-21.5 lbf ft)



Manual transmission

Gearbox oil level - check

Check the oil level on the engine oil dipstick. Remove the filler plug and insert the stick so that the slot lines up with the sealing surface for the plug (as shown). Read the oil level on the side of the dipstick which has two marks and the word GEARBOX on it. The oil level should be between the marks.



Manual transmission oil:
SAE 10W-30, API SE

Automatic transmission

Gearbox oil level - check

The oil level must be between the upper marks on the dipstick when warm (80°C, 176°F) or the lower marks when cold (40°C, 104°F).

The engine should be idling and on level ground.

Top up with Dexron II only.

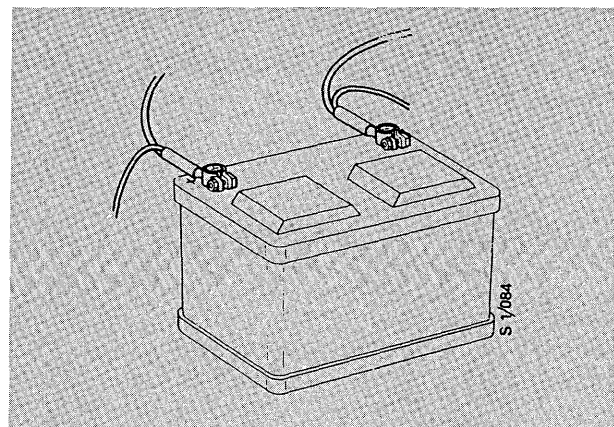
Gearbox oil - change

The oil should be changed and the filter changed at 20,000 km (15,000 miles) intervals if the car is used for trailer towing or when used in the city under continuous warm weather conditions.

Electrical system

Battery - check terminal connections

Clean and tighten the battery terminals and ground strap connections.



Functional check - electrical system

Lamps

Check operation of headlights, turn signals, emergency flashers, stop lights, tail lights, marker lights, cornering lights and back-up lights including forward mounted side guidance reversing lights.

Electrical equipment

Check operation of warning lamps, instruments, horn, wiper and washer controls and ventilation controls. Check function of ACC controls, power windows, power sunroof and central locking system, if so equipped.

Accessories

Check function of radio, electric antenna, speed control, fog lamps and other accessories, if so equipped.

Chassis

Measure/adjust front wheel toe-in

Check front wheel toe-in and adjust as necessary.

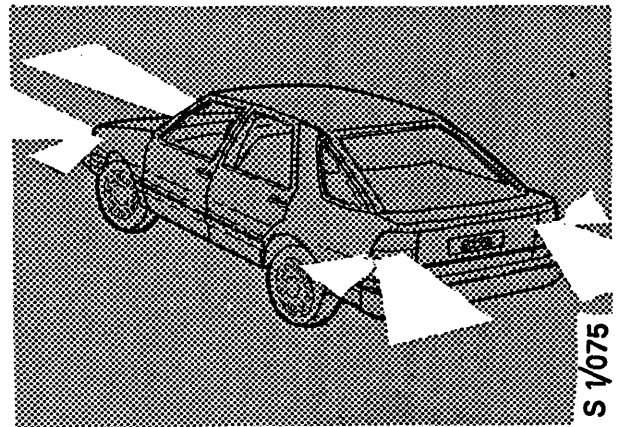
Toe-in is measured at the rims and at points level with the front axle. Both tie rods should be adjusted equally.

Specification:

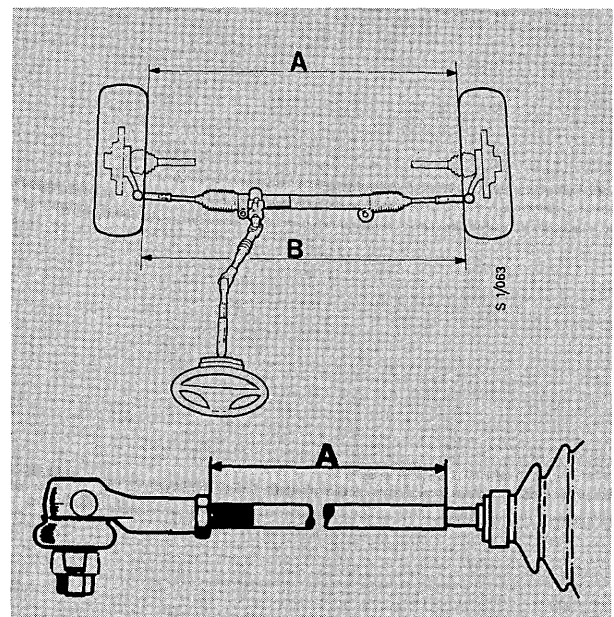
Measured at the Rims (410 mm or 16.1 in)	Measured at a Uni- versal 28.64 in circle
$1.5 \pm 1 \text{ mm}$ ($0,06 \pm 0,04 \text{ in}$)	$2.6 \pm 1.7 \text{ mm}$ ($0,1 \pm 0,07 \text{ in}$)

After adjusting the toe-in, distance A, between the lock nut and the outer edge of the groove on the track rod, must not exceed 140 mm (5.51 in) under any circumstances.

The difference in distance A between the track rods must not exceed 2 mm (0.079 in).



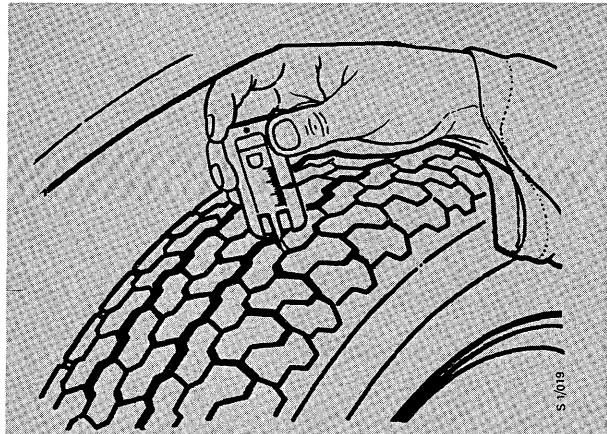
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Tires - check

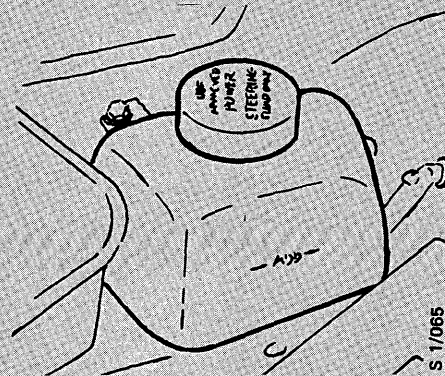
Check the tread depth and for excessive wear.

Rotate tires front to rear same side.

**Power steering fluid - check level**

At normal temperature the fluid levels should be between HOT and COLD marks. If checked when cold the level should be between marks for COLD level and mark for ADD.

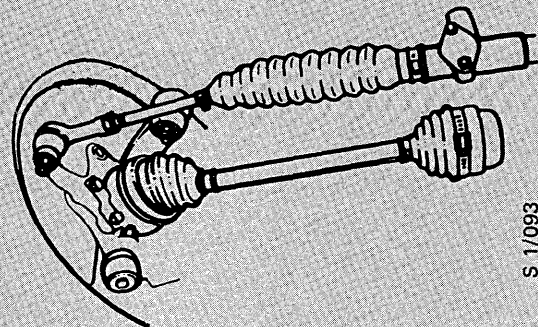
Grade of fluid: GM Specification. Texaco 4634 Power steering fluid.

**General inspection - underside**

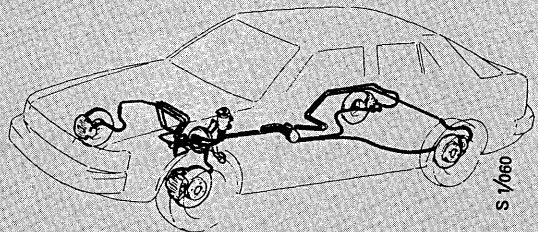
Check underside for damages.

Check rubber boots for drive shaft joint, ball joints and tie-rod ends.

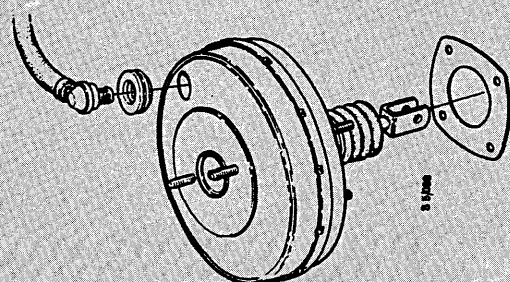
Check condition of brake lines and hoses, and tightness of master cylinder, calipers and screw caps. Correct as necessary.

**Brake system**

Check condition of brake lines and hoses, and tightness of master cylinder, calipers and screw caps. Correct as necessary.

**Power brake servo - check**

Check hose between inlet manifold and vacuum servo unit for leaks.



Check hand brake function

Test handbrake. Slide the brush seal off the handbrake lever inside the car.

Lift the plastic locking plate off the adjusting nuts.

Adjust the cable as follows.

Place a 1.0 mm feeler gauge between the handbrake lever and the stop on the caliper and turn the nut until the feeler gauge drops down. The gap should be 1.0 ± 0.5 mm (0.05 ± 0.02 in).

Brake pads - check

Remove the wheels and check the lining thickness on the pads.

Fit new pads if the lining thickness has worn to: 1 mm (0.04 in)

Thickness of new lining: front 11 mm (0.43 in); rear 11 mm (0.43 in)

Brake fluid level - check

The level should be maintained between MAX and MIN marks.

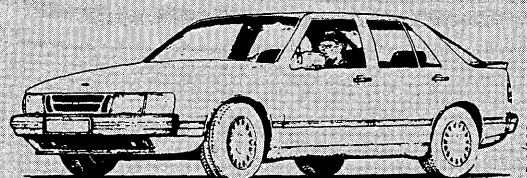
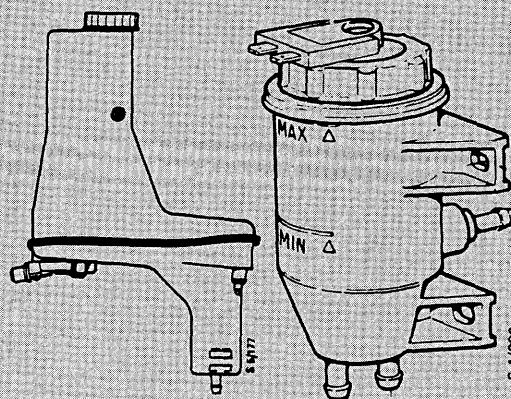
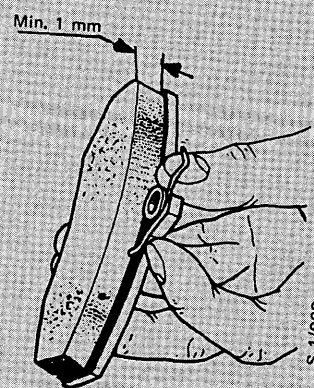
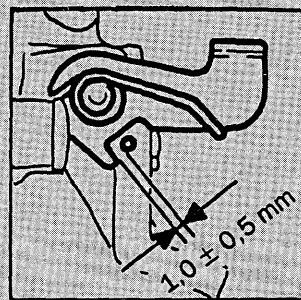
Brake fluid: DOT4, SAE J 1703 Hydraulic brake fluid

Do not use DOT5

Miscellaneous

Test Drive

Check overall conditions noting especially the function of brakes and clutch. Check general engine performance.



Major service

Check list Major service

(Sample checklist shown. Refer to the appropriate checklist located in the vehicle's Warranties/Service Records Booklet).

A. EMISSION SYSTEM MAINTENANCE

- Valve Clearance—Check/adjust (cold engine) and clean oil separator in camshaft cover [8 Valve engines only].
- Spark Plugs—Replace.
- Air Cleaner Insert—Replace.
- Fuel Filter—Replace.
- Evaporative Emission Controlled Fuel System—Check condition.
- Charcoal canister—Replace.
- Crankcase Ventilation—Check condition. (Inspect check valve and test function, Turbo only.)
- Secondary Ignition Wires—Clean and inspect. Check resistance.
- Distributor Cap and Rotor—Replace. Check/adjust ignition timing.
- Oxygen Sensor—Replace sensor [all engines]. (Reset service reminder lamp, 8 Valve engines only.)
- Engine Oil and Oil Filter—Change.
- Idle Speed—Check/adjust.
- Deceleration System—Check/adjust, including throttle switch if so equipped.
- Overpressure Safety Switch—Check operation [Turbo only].

B. VEHICLE MAINTENANCE

ENGINE

- V-Belts—Check/adjust tension.
- Cooling System—Check condition.
- Engine Coolant—Flush system and replace coolant mixture.
- Fuel Injection System Safety Check—Check condition.
- Exhaust System—Check condition.

MANUAL TRANSMISSION

- Gearbox Oil Level—Check/add.

AUTOMATIC TRANSMISSION

- Gearbox Oil Level—Check/add.
- Differential Oil Level—Check/add [900 only].

ELECTRICAL SYSTEM

- Battery—Check terminal connections.
- Functional Check—Lamps, electrical equipment and accessories.

- Headlights—Check aim.

CHASSIS

- Wheel Alignment—Check/adjust camber, caster, toe-in [900 only].
- Toe-in—Check/adjust [9000 only].
- Upper and Lower Ball Joints, Tie-Rod Ends and Steering Column Joint—Check for wear.
- Shock Absorbers—Check bushings and dampening action.
- Tires—Check condition and rotate front to rear, same side.
- Power Steering Fluid—Check/add.
- General Inspection—Check underside for damage. Check rubber boots for drive shaft joints, ball joints and tie-rod ends.
- Brake System—Check component condition.
- Power Brake Vacuum Servo—Check hose for leaks.
- Hand Brake—Check function.
- Brake Pads—Check lining thickness.
- Caliper Yokes, Front—Apply special grease to sliding surfaces [900 only].
- Brake Fluid—Bleed system and replace.

MISCELLANEOUS

- Door Hinges, Throttle Control and Hood Latch—Lubricate sparingly.
- Change ventilation air filter [9000 only].
- Test Drive Vehicle—Check overall condition, noting especially the function of brakes and clutch. Check general engine performance. On Turbos observe boost gauge under acceleration and note APC System function.

Emission system maintenance

Valve clearance - Check/adjust

16-valve engines are equipped with hydraulic valves and require no service.

Spark plugs - replace

Check and regap or replace as necessary at 15,000 miles intervals if the vehicle is used in Severe Service. This is described as extensive idling, stop-and-go driving and driving in cold climates on repeated short trips without sufficient engine warm-up.

Beginning with 1988 models, Federal Regulations state that the spark plugs may not be inspected or replaced before 30,000 miles. Beginning with the 60,000 Major Service the plugs may be inspected, cleaned, regapped or replaced at intervals of 15,000 miles.

Do **not** use heat ranges that are not recommended by Saab.

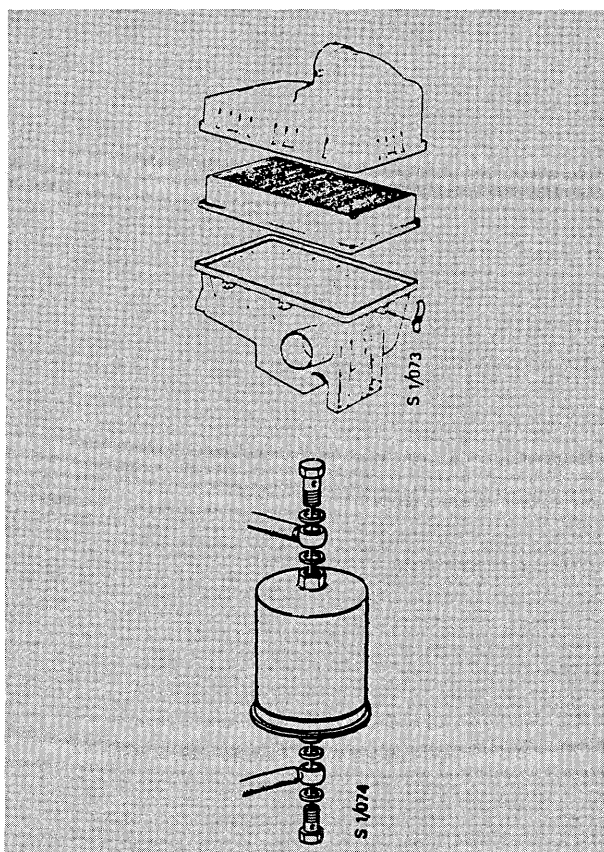
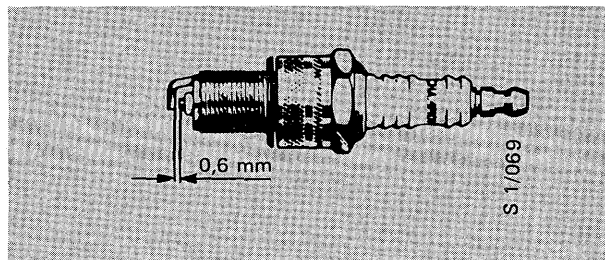
Engine	Normal driving	Hard driving
Turbo	NGK BCP 7EV NGK BCP 7ES Bosch F7DC	NGK BCP 6EV
Non-Turbo	NGK BCP 6ES NGK BCP 6EV	

Electrode gap:	0.6 mm (0.024 in)
Tightening torque:	25-29 Nm (18.5-21.5 lbf ft)

Air Cleaner insert - replace

Fuel filter - replace

Change the fuel filter and the seals on the fuel-line connections.

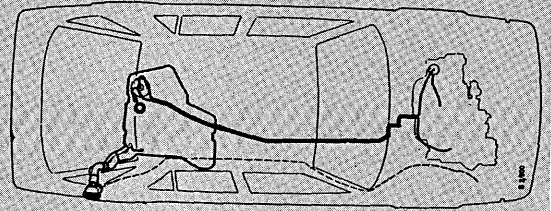


Evaporative emission controlled

Fuel system - check

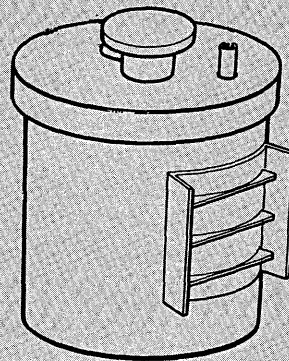
Note: Interval every 80,000 km (60,000 miles)

Check fuel filler cap, vent lines, canister, and connections for wear, deterioration and/or damage which could cause leakage. Tighten any loose connections and/or replace any leaking components.



Charcoal canister - replace

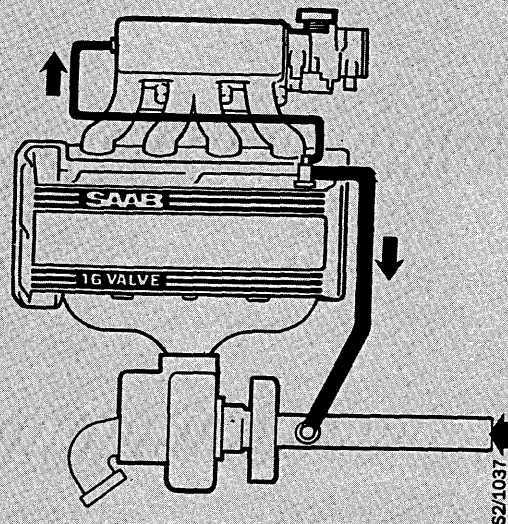
Note: Interval every 80,000 km (60,000 miles)



Crankcase ventilation - check

Note: Interval every 80,000 km (60,000 miles)

Check condition on hoses and connections for crankcase ventilation.



Secondary ignition wires - check

Clean and inspect wires. Check resistance.

Wire specification: Wire between	
Distributor - plug	2-4 kOhm
Coil - distributor	0.5-1.5 kOhm

Distributor cap and rotor - replace

Note: Interval every 80,000 km (60,000 miles)

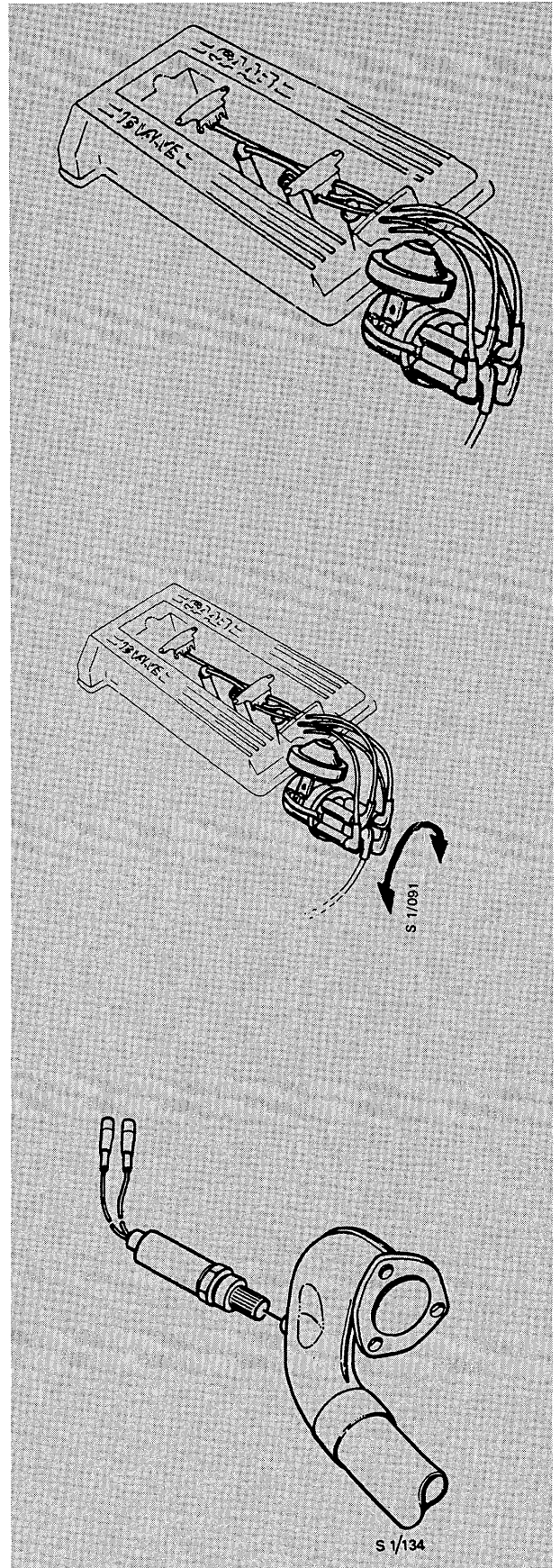
Replace distributor cap and rotor. Check/ adjust ignition timing.

16-valve engines: check ignition timing at 850 RPM

Specification: 16-valve engines	
Turbo	16° BTDC
Non-Turbo	14° BTDC

Oxygen sensor - replace

Replace sensor every 80,000 km (60,000 miles).

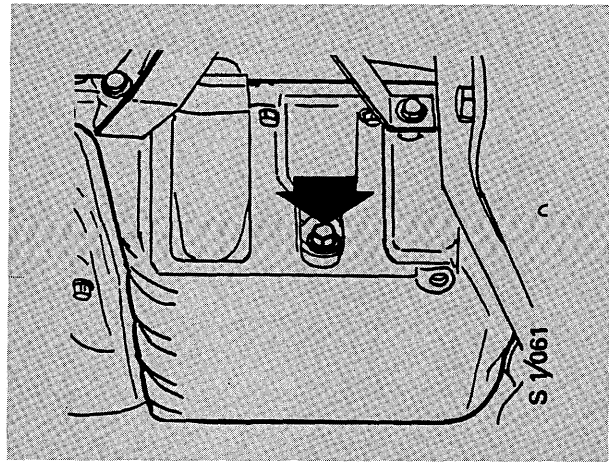


Engine oil and oil filter - change

Oil capacity: 16-Valve 4.2 liters (4.5 qts)

Use only oil which meets API Service SF/CD or SF/CC.

Above 0°F (-17°C)	SAE 10W-30 or 15W-40
Below 0°F (-17°C)	SAE 5W-30



Check/adjust idle speed (Engine Warm)

16-valve Turbos

Setting the idling speed on cars with AIC.

The following is a new method for adjusting the AIC system. It is more accurate, making for more reliable operation, and involves the use of a dwell angle tester and tachometer, or the LH system tester.

Before starting work on the AIC system, check the ignition timing and CO setting.

Tools: Dwell angle tester and Tachometer
or
Digital inductive dwell meter and Tachometer
or
LH-system tester
Throttle stop locknut T-wrench 8394322

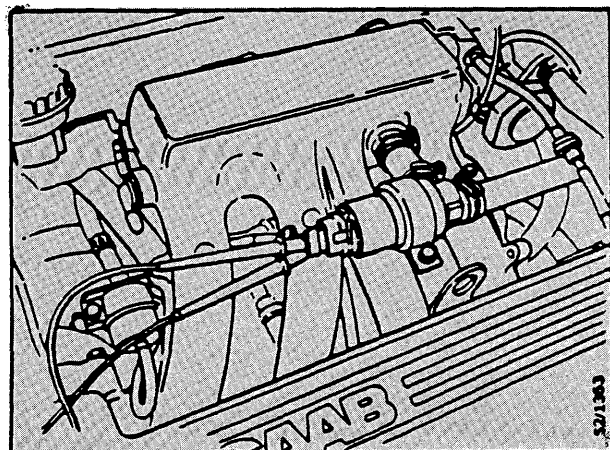
The accuracy of the dwell angle tester and the digital inductive dwell meter should be $\geq \pm 0.5\%$.

- 1 Start the engine and run it up to normal temperature. (It is vital that the transmission oil be hot.)
- 2 Undo the locknut on the throttle damper (dashpot) and lower the dashpot clear of the throttle lever.

When using a dwell angle tester:

- 3 a Pull back the rubber boot on the AIC valve connector and connect the dwell angle tester probes to pins 2 and 3 (valve terminals 4 and 5).

Connect the tachometer.



26 Major service

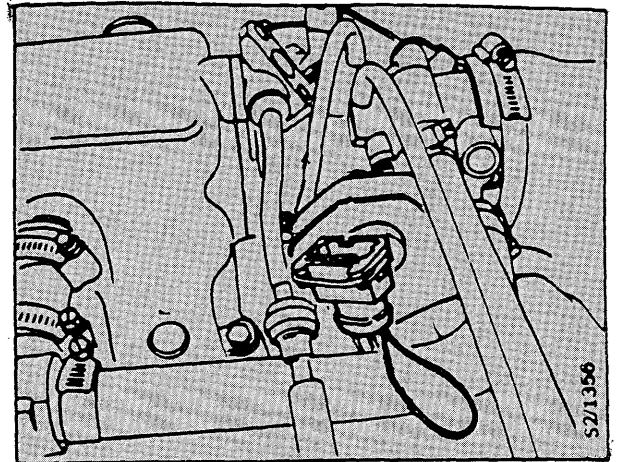
When using digital inductive dwell meter:

- 3 b Pull back the rubber boot on the AIC valve connector. Insert probe into pin 3 (valve terminal 5) and connect lead of dwell meter.

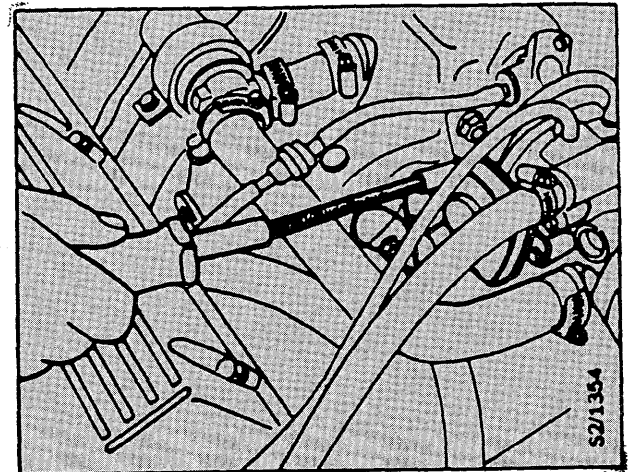
Connect the tachometer.

When using the LH system tester:

- 3 c Undo the ECU securing screws and connect the LH system tester between the ECU and the ECU wiring-loom connector.
- 4 Unplug the connector for the throttle-position sensor and connect a jumper lead between pins 1 and 2 on the back of connector (terminals 2 and 18 on the throttle-position sensor). This simulates closed contacts for the idling position.



- 5 Undo the two retaining screws for the throttle-position sensor and rotate the sensor clear of the throttle butterfly. Make sure that the throttle cable is slack so that it cannot interfere with movement of the butterfly.
- 6 Start the engine and isolate all possible loads, such as the AC system, headlights, seat heaters, etc.



N.B.

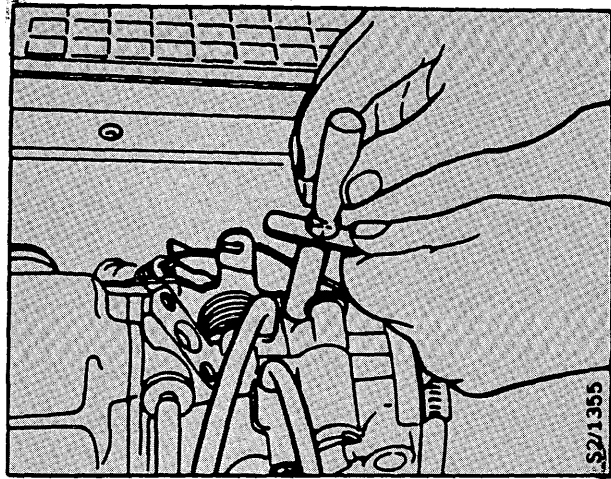
Setting must not be carried out when the radiator fan is running.

Cars not fitted with air bleed screw:

- 7 a Loosen throttle stop screw locknut and turn adjusting screw counterclockwise until it no longer touches the throttle linkage.

Cars fitted with air bleed screw:

- 7 b Loosen throttle stop screw locknut and turn adjusting screw counterclockwise until it no longer touches the throttle linkage. Slowly turn screw clockwise until it just contacts the linkage then turn screw an additional 1/2 - 3/4 turn clockwise and tighten locknut. Loosen air bleed screw locknut and turn air bleed screw in (clockwise) until fully seated.

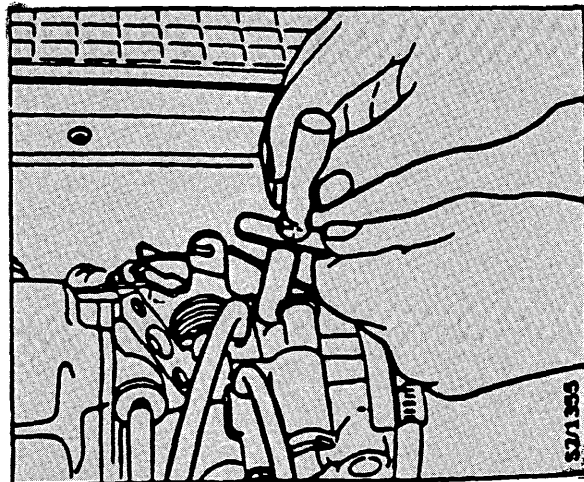
**N.B.**

The meter reading should increase to a minimum of 34° or 38%.

If difficulty is encountered in obtaining this value, check for air leaks in the inlet manifold downstream of throttle housing or improperly centered throttle plate.

- 8 Turn the adjusting screw clockwise so the AIC valve setting slowly decreases.

When the reading shows the correct setting value, the idling speed should be 850 r/min.

**N.B.**

When using LH-system tester, the adjustment must be done **slowly** due to delay time for calculation.

AIC-valve setting values

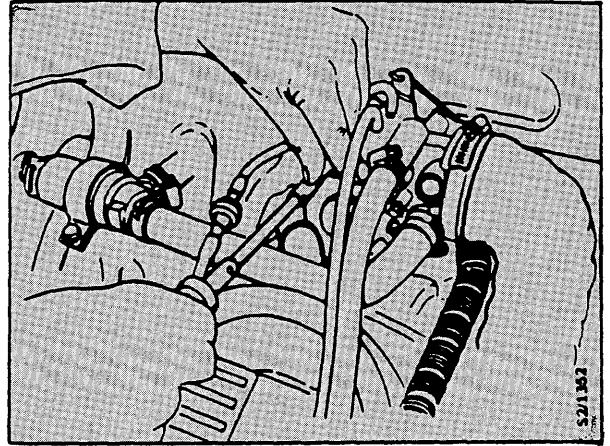
Using dwell angle tester (degrees)	Using LH system tester (%)	
32	35	New car < 1000 miles
30	33	Run in car > 1000 miles

Value tolerance: ± 1 degree/± 2%

28 Major service

- 9 Tighten the locknut on the adjusting screw **taking care not to alter the setting.**
- 10 Switch off the engine.
- 11 Reset the throttle-position sensor (closed in idling position).

Check the setting: move the throttle lever and if the setting is correct a light metallic click should be heard as the sensor switches from the idling position. Do not confuse this with click from upshift switch.



- 12 Set the throttle dashpot to close within a period of 4 ± 1 seconds and then tighten the locknut.
- 13 Remove the jumper lead from the throttle-position sensor connector and plug the connector onto the sensor.
- 14 Remove the probes from the AIC valve connector and push back the rubber boot.

If the LH system tester has been used, unplug the connector and refit the LH control unit.
- 15 Turn AC on and ensure that the idling speed increases slightly.

16 valve naturally aspirated

The idle speed is pre-set at the factory and need not be adjusted.

Dashpot system

Engine not running

Time taken for lever to move from contact position (lever-damper) to idling position. Time 4 ± 1 sec.

Check throttle switch

Check the function of the throttle switch. Work the throttle by hand and note the following:

- 1 As the throttle is closed, an audible "click" should be heard as the throttle returns to its resting position.
- 2 Adjust the switch only if necessary.

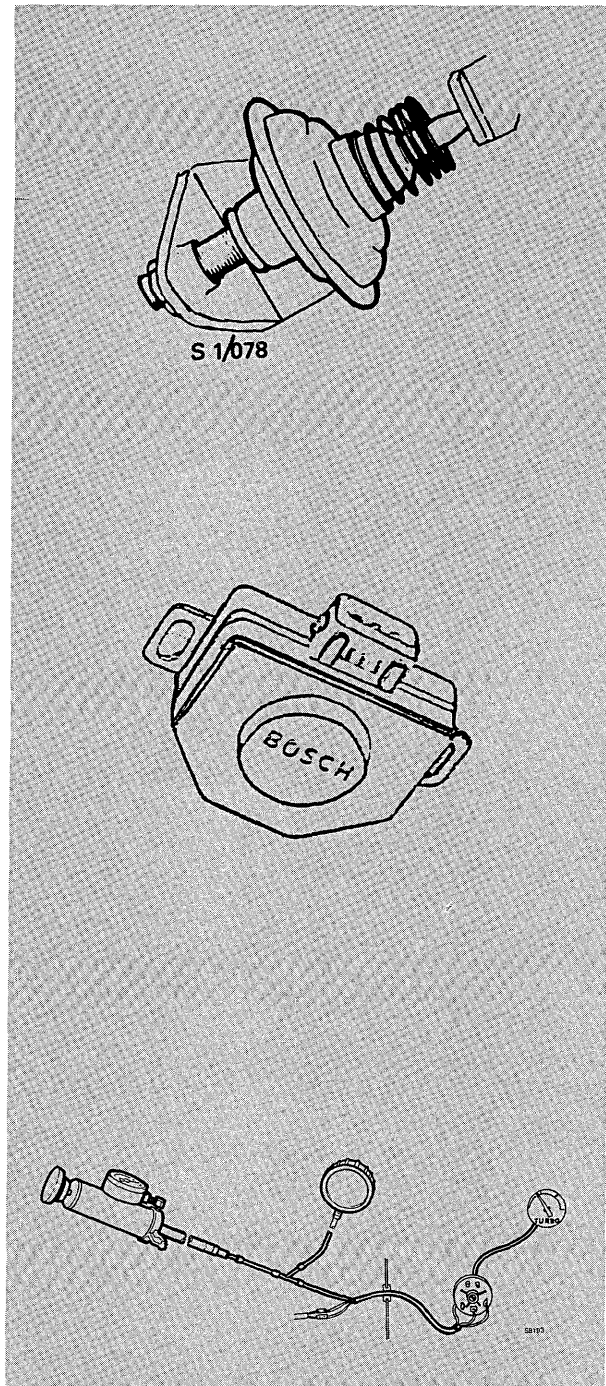
Overpressure switch - check

Start the engine and let it idle. Disconnect the hose to the pressure switch from the inlet manifold. Connect measuring apparatus 8393514 with a suitable air pump (e.g. that used for pressure testing the cooling system) to the hose. Raise the pressure and check that the engine stalls at a pressure of 1.10 ± 0.05 bar.

Disconnect the apparatus and reconnect the hose.

Cutout pressure:

16-Valve $1.10 + 0.05$ bar ($16 + 0.7$ psi)



Vehicle maintenance

Engine

Drive belt tension - check/adjust

Check the tension of the drive belts using an IPU belt-tension meter. Meter readings:

Alternator

New belt: 800 ± 45 N (180 ± 10 lbf)

Lower limit: 355 N (80 lbf)

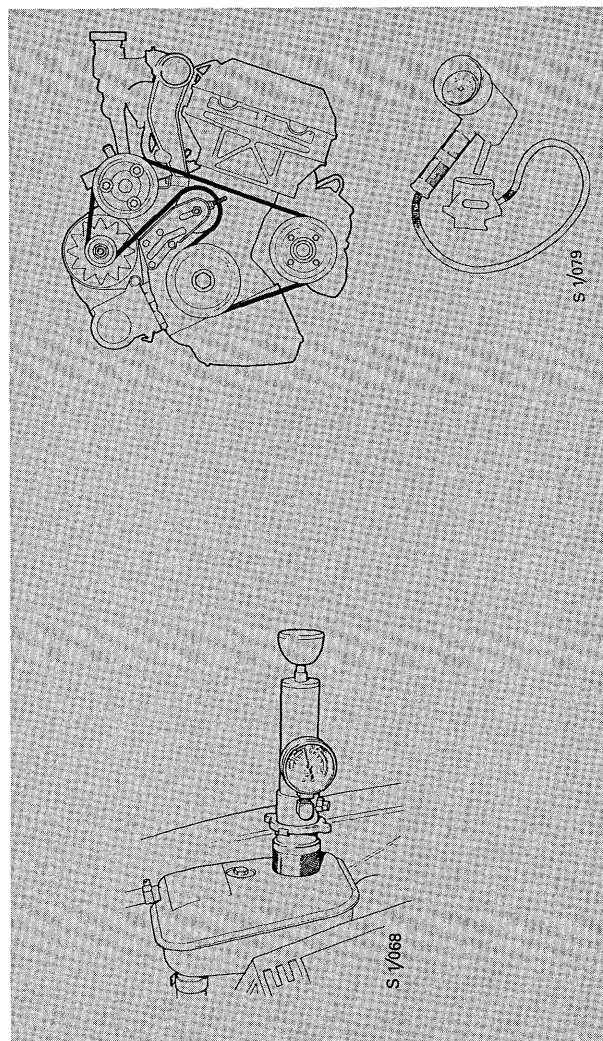
Setting value: 535 ± 45 N (120 ± 10 lbf)

AC drive belt:

New belt: 535 ± 45 N (120 ± 10 lbf)

Lower limit: 265 N (60 lbf)

Setting value: 355 ± 20 N (80 lbf)



Cooling system - check

Check the coolant level. Top up as necessary using a mixture of equal parts of Saab Original Coolant and water. Do not mix different types of coolant. If the system has been topped up, pressure test the system.

Maximum test pressure 1.2 bar.

Engine coolant - replace

Flush system and replace engine coolant. Refill with a mixture of 50 % pure water and 50 % engine coolant.

Specification:

Contents: 10 liters (10.5 qts)

Type: SAAB Brand Coolant - BASF G-105

Fuel injection system - check

Inspect components, electrical cables, fuel hoses, and all connections for wear, damage, and/or deterioration. Tighten any loose connections and/or replace any damaged components.

Exhaust system - check

Check for leakage and ensure that all fasteners and hangers are secure. Correct as necessary.

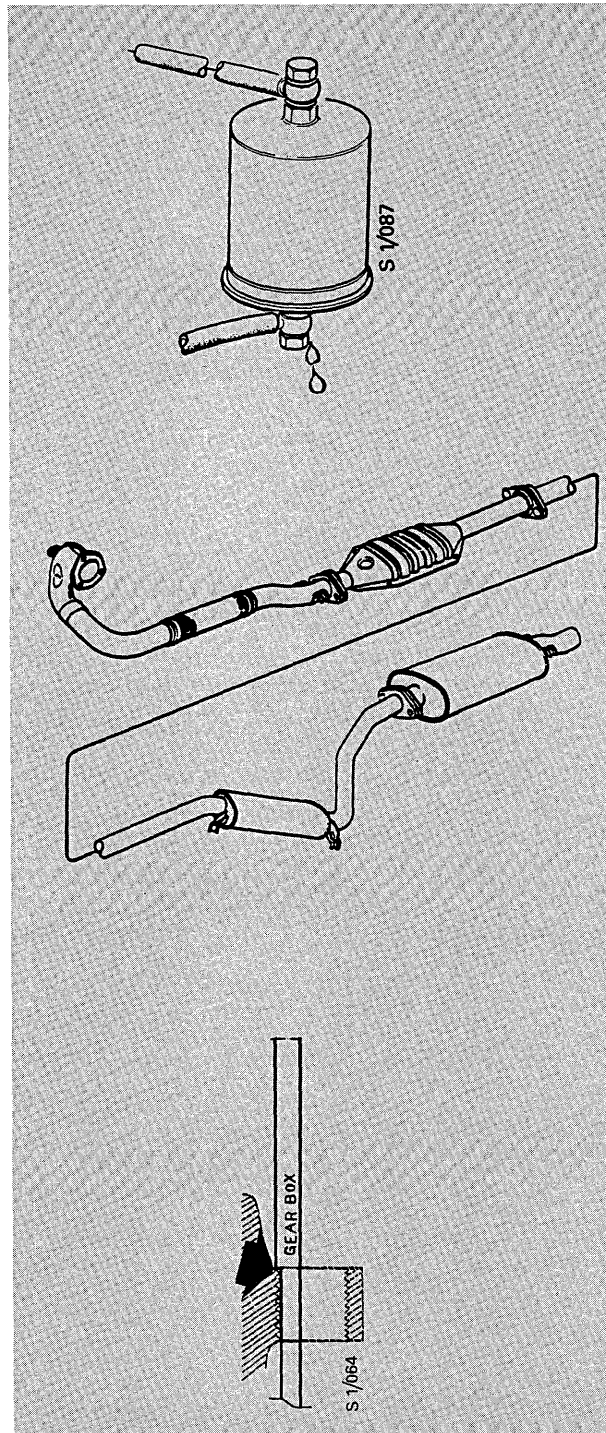
Manual transmission

Gearbox oil level - check

Check the oil level on the engine oil dipstick. Remove the filler plug and insert the stick so that the slot lines up with the sealing surface for the plug (as shown). Read the oil level on the side of the dipstick which has two marks and the word GEARBOX on it. The oil level should be between the marks.

Grade of oil SE or SF oil

Viscosity: 10W30 or 10W40



Automatic transmission

Gearbox oil - change

The gearbox oil must be changed and the filter must be changed at intervals of 40,000 km (30,000 miles). Use Dexron II only.

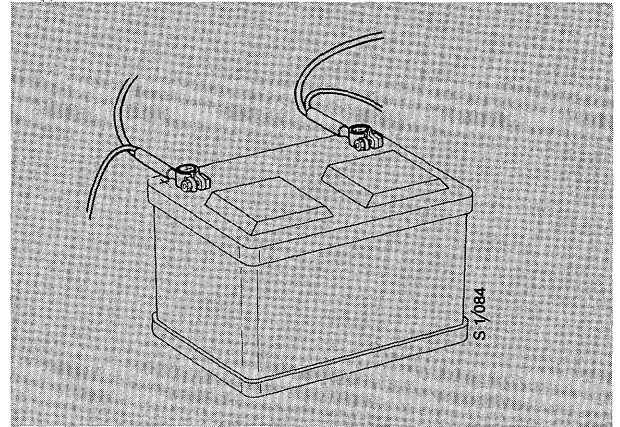
Oil Capacity 8.2 l (8.6 qts.)

Electrical system

Battery - check terminal connections

Clean and tighten the battery terminals and ground strap connections.

Batteries are maintenance free and normally requires no electrolyte level check.

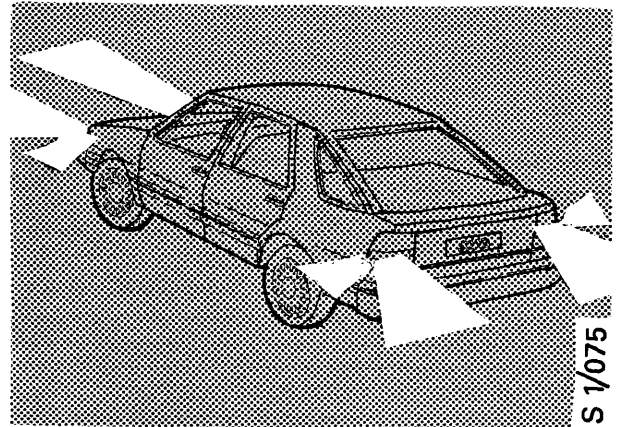


Functional check

Check operation of headlights, turn signals, emergency flashers, stop lights, tail lights, marker lights, cornering lights and back-up lights including forward mounted side guidance reversing lights.

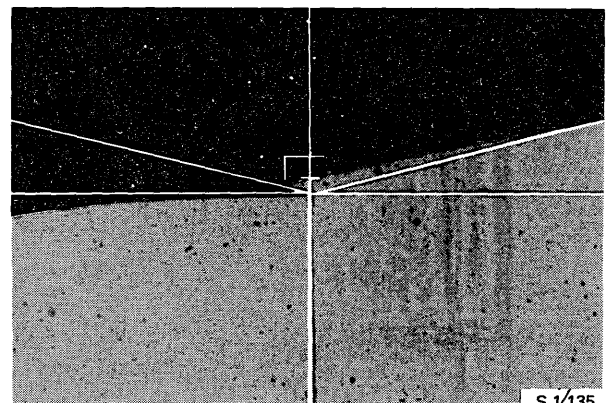
Check operation of warning lamps, instruments, horn, wiper and washer controls and ventilation controls. Check function of ACC controls, power windows, power sunroof and central locking system, of so equipped.

Check function of radio, electric antenna, speed control, fog lamps and other accessories, of so equipped.



Head lights - check aim

Check/adjust headlights using approved headlight aiming equipment. Follow applicable state regulations.



Chassis

Measure/adjust front wheel toe-in.

Check front wheel toe-in and adjust as necessary.

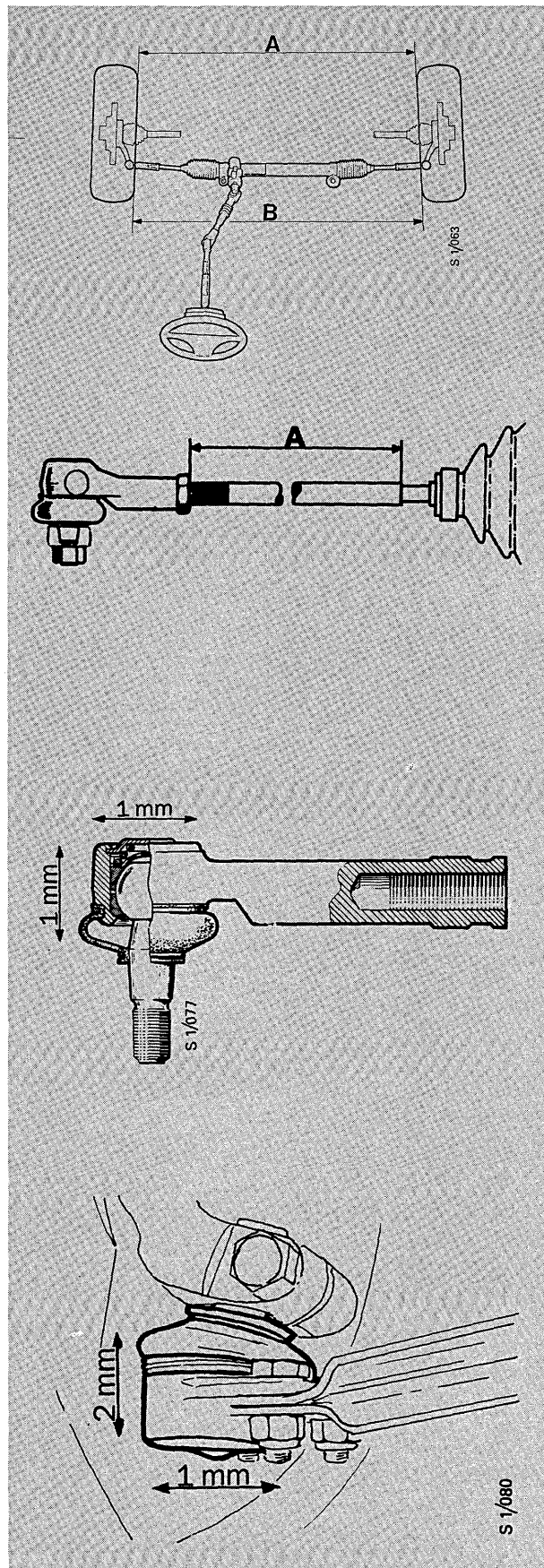
Toe-in measured at the rims and at points level with the front axle. Both tie rods should be adjusted equally.

Specification: B-A

Measured at the Rims (410 mm or 16.1 in)	Measured at a Uni- versal 28.64 in circle
$1.5 \pm 1 \text{ mm}$ ($0,06 \pm 0,04 \text{ in}$)	$2.6 \pm 1.7 \text{ mm}$ ($0,1 \pm 0,07 \text{ in}$)

After adjusting the toe-in, distance A, between the lock nut and the outer edge of the groove on the track rod, must not exceed 140 mm (5.51 in) under any circumstances.

The difference in distance A between the track rods must not exceed 2 mm (0.079 in).



Ball Joints, Tie-Rod Ends - Check

Check both sides of vehicle for wear. Also check steering gear universal joints. Correct any unsafe condition.

Axial play in ball joint rack and pinion gear: max 1 mm (0.04 in)

Axial play in track-rod ends: max 1 mm (0.04 in)

Ball joints (suspension arms)

Check the wear in the ball joints.

Axial play: max 2 mm (0.08 in)

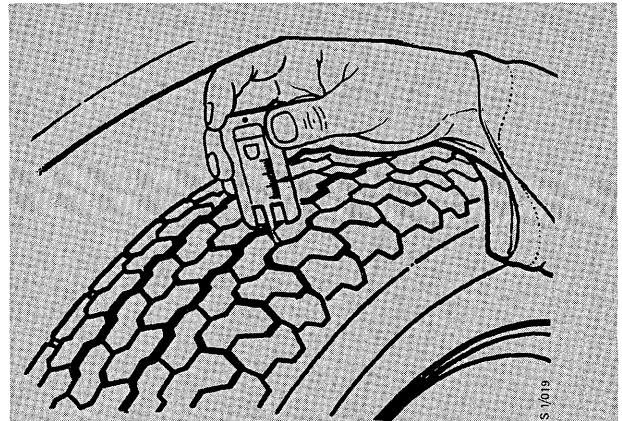
Radial play: max 1 mm (0.04 in)

Shock absorbers - check

Check rubber bushings and dampening action.

Tires - check

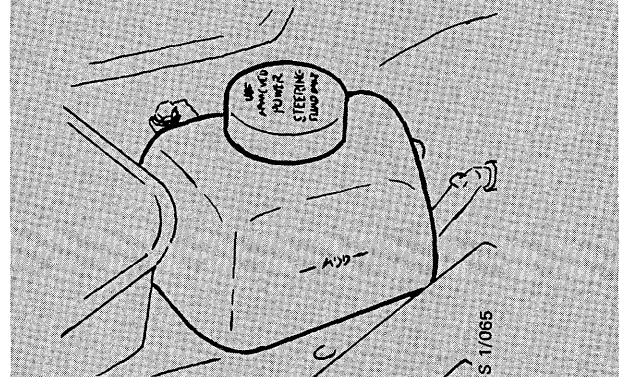
Check condition and rotate front to rear same side. Check tire tread depth and replace when wear bars in tread appear.



Power steering fluid - check level

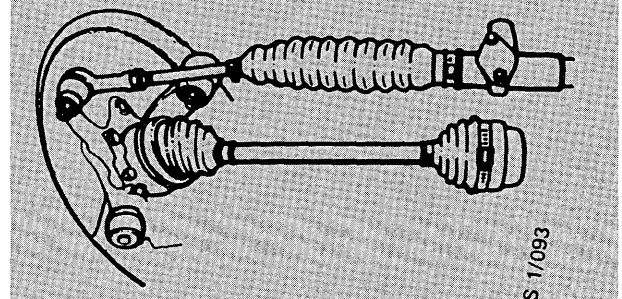
At normal temperature the fluid levels should be between HOT and COLD marks. If checked when cold the level should be between cold marks for COLD level and mark for ADD:

Grade of fluid: GM-specification. Texaco 4634 Power steering fluid



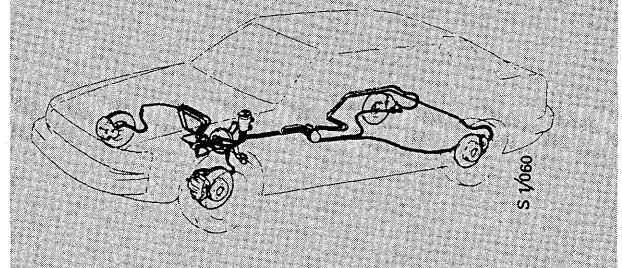
General inspection - check underside

Check underside for damages. Check rubber boots for drive shaft joint, ball joints and tie-rod ends.



Brake system - check

Check condition of brake lines and hoses, tightness of master cylinder, calipers, and bleed nipples. Correct as necessary.



Power brake vacuum servo - check

Check vacuum servo hose and connections. Correct any vacuum leaks.

Check hand brake function

Slide the brush off the handbrake lever inside the car.

Lift the plastic locking plate off the adjusting nuts.

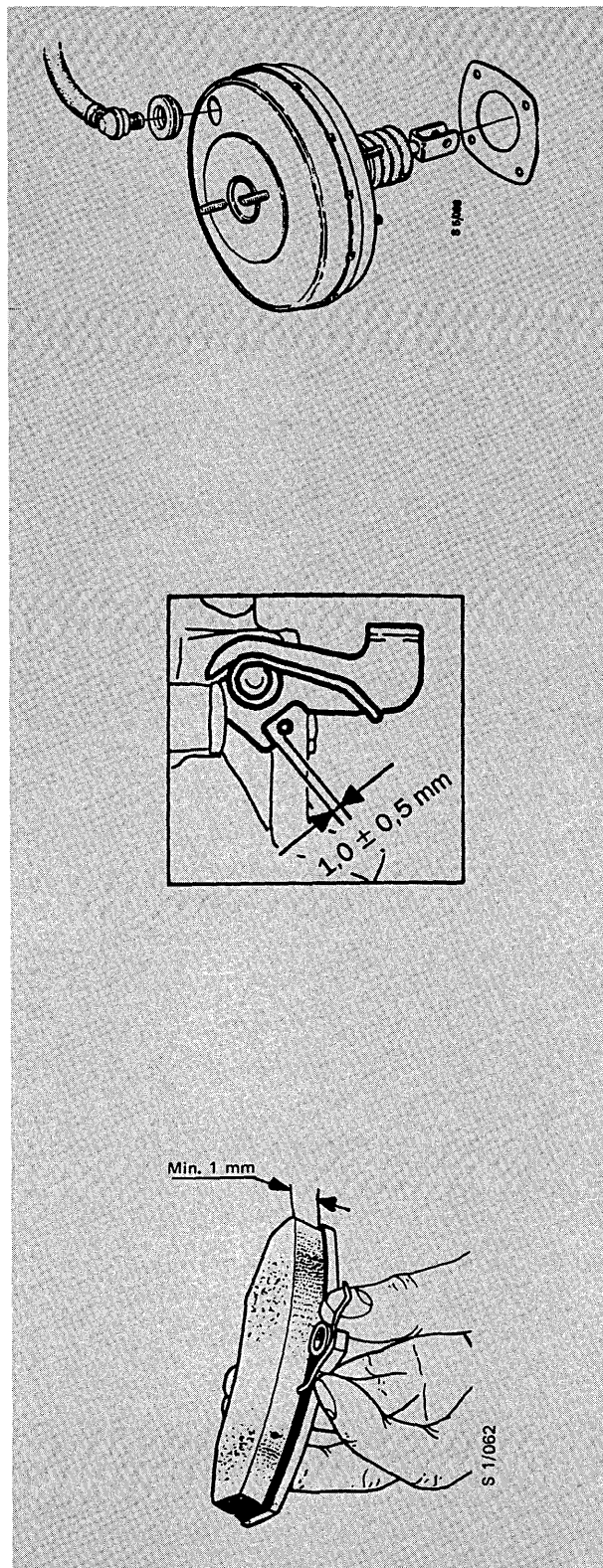
Adjust the cable as follows.

Place a 1.0-mm feeler gauge between the handbrake lever and stop on the caliper and turn the nut until the feeler gauge drops down. The gap should be $1.0-0.5$ mm (0.04 ± 0.02 in).

Brake pads - check

Remove the wheels and check the lining thickness on the pads.

Fit new pads if the lining thickness has worn to 1 mm (0.04 mm)



Brake fluid - replace

Bleed system and replace brake fluid.
Refer to Section 5, Group 520-1, 9000 Service Manual.

Brake fluid: DOT4, SAE J 1703 Hydraulic brake fluid

Do not use DOT5

Miscellaneous

Ventilation system filter change

To be carried out every 30,000 miles.

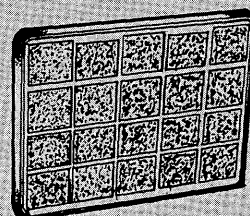
Door hinges and hood latch - lubricate

Lubricate sparingly the door stops and hinges, and engine hood lock mechanism.

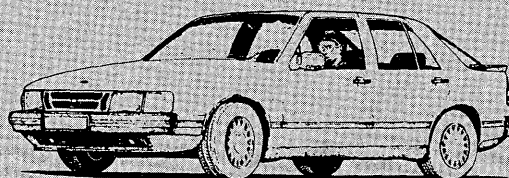
Test drive

Test drive vehicle and check overall condition, noting especially the function of brakes and clutch. Check general engine performance.

Turbos: Observe that the boost gauge needle enters the orange zone when accelerating above 2,000 RPM and the APC-System controls maximum boost when knocking is detected. (If test drive boost is unsatisfactory, connect a gauge and check basic setting and maximum pressure). Adjust basic setting, if necessary, and reseal wastegate actuator with anti-tampering wire. Refer to Section 2, Group 291, 9000 Service Manual.



Standard ACC





SAAB

Saab Automobile AB
Trollhättan, Sweden



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