

# Saab 9000

Service Manual



**M 1996**

**ENG**

**0 News**

# Saab 9000

## SERVICE MANUAL

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**0 News.**

M 1996

### Foreword

This manual contains brief descriptions of the most important new features in year model 1996.

The manual is intended both for use as a service manual and as a text book for training instructors and mechanics.

As no series produced cars were available at the time the manual went to press, no information provided is binding.

We reserve the right to make changes without prior notice.

Saab Automobile AB

Technical data

General

Service

Engine

Electrical system

Transmission

Brakes

Wheel suspension

Body



RECYCLABLE PAPER

## Warning, Important and Note

The headings "Warning", "Important" and "Note" occur from time to time in the Service Manual. They are used to draw the attention of the reader to information of special interest and seriousness. The importance of the information is indicated by the three different headings and the difference between them is explained below.

### **WARNING**

Warns of the risk of material damage and grave injury to mechanics and the driver, as well as serious damage to the car.

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### **Important**

Points out the risk of minor damage to the car and also warns the mechanic of difficulties and time-wasting mistakes.

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### **Note**

Hints and tips on how the work can be done in a way that saves time and labour. This information is not supplied for reasons of safety.

## Market codes

The codes refer to market specifications

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

# Technical data

## Chassis number

YS3 C D 4 5 M X T 1 000001

**Nos. 1-3**  
Manufacturer

Saab Automobile AB

**No. 4**  
Car type

C = Saab 9000

**No. 5**  
Model series

- C = 9000 CD/CS with driver airbag
- D = 9000 CD/CS with driver and passenger airbags
- E = 9000 CDE/CSE with driver airbag
- F = 9000 CDE/CSE with driver and passenger airbags
- G = 9000 Aero with driver airbag
- H = 9000 Aero with driver and passenger airbags
- K = 9000 Griffin with driver airbag
- M = 9000 Griffin with driver and passenger airbags

**No. 6**  
Body type

- 4 = 4-door Sedan (CD)
- 6 = 5-door Combi Sedan (CS)

**No. 7**  
Type of transmission

- 5 = 5-speed, manual
- 8 = 4-speed, automatic

**No. 8**  
Engine type

- B = 2.3 injection
- J = 2.0 injection
- M = 2.3 Turbo
- N = 2.0 Turbo
- R = 2.3 Turbo, high power
- T = 2.0 Turbo, low charge pressure
- U = 2.3 Turbo, low charge pressure
- W = 3.0 V6

**No. 9**  
Control number

0-9 or X

**No. 10**  
Year model

T = 1996

**No. 11**  
Place of manufacture

1 = Trollhättan

**Nos. 12-17**  
Manufacturing number

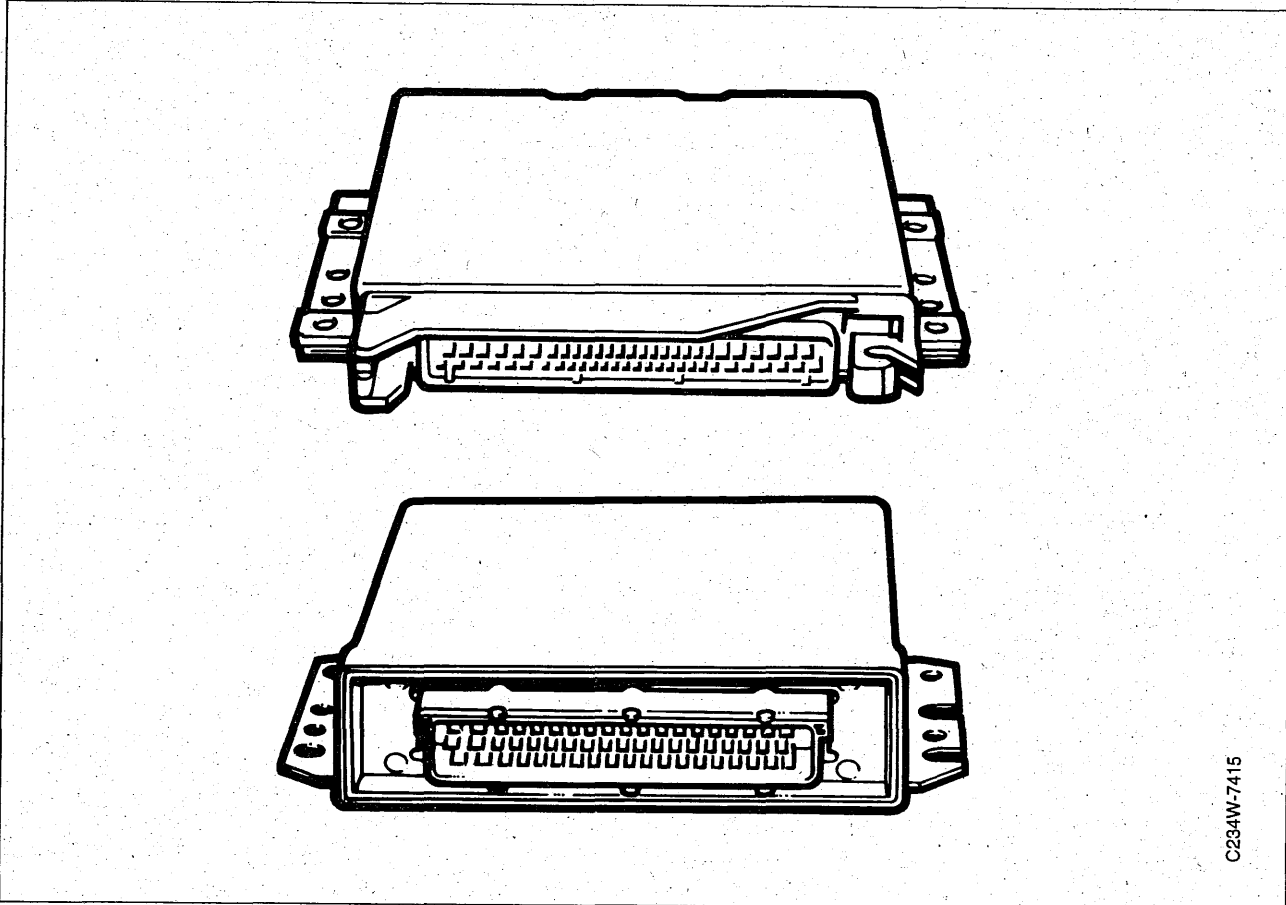
Serial number in model year



# General

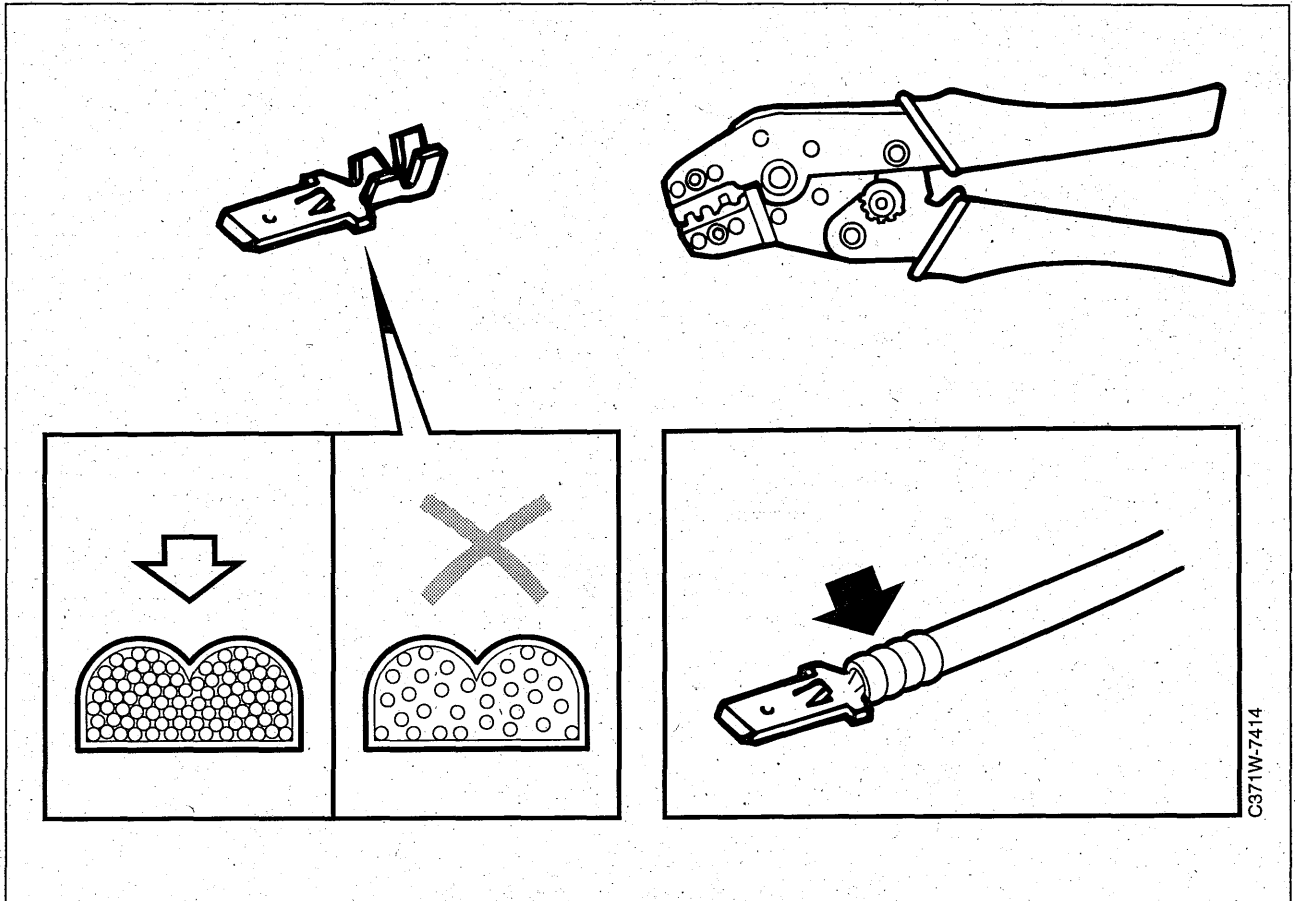
OBDII, USA/Canada . . . . .	3	New Flash memory module in ISAT scan tool . . .	5
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## OBD II, USA/Canada



From M1996, all Saab 9000s with US specification will have an improved engine management system with complies with the legal requirements of OBDII. The main difference between OBDI and OBDII is fault diagnosis on emissions-related components and features.

## Repairs to cars with OBDII



### Repairing wiring harnesses

It is extremely important that all repairs to wiring harnesses are carried out correctly. Otherwise, the malfunction indicator (CHECK ENGINE) lamp can light and a diagnostic trouble code may be generated.

### Cable terminals

Gold plated cable terminals must be replaced with gold plated cable terminals and tin plated ones must be replaced with tin plated ones.

### Crimping cable terminals and splices

It is extremely important that crimping is carried out correctly. If crimping is faulty and there is a gap between the crimp and a single copper strand, the malfunction indicator (CHECK ENGINE) lamp may light. The pliers used must therefore be intended for this purpose and be the correct size. Saab Automobile AB will be able to supply a number of pliers of various sizes as special tools.

### Insulation

Always insulate crimps and damaged insulation using adhesive shrink hose. Never use electrical tape.

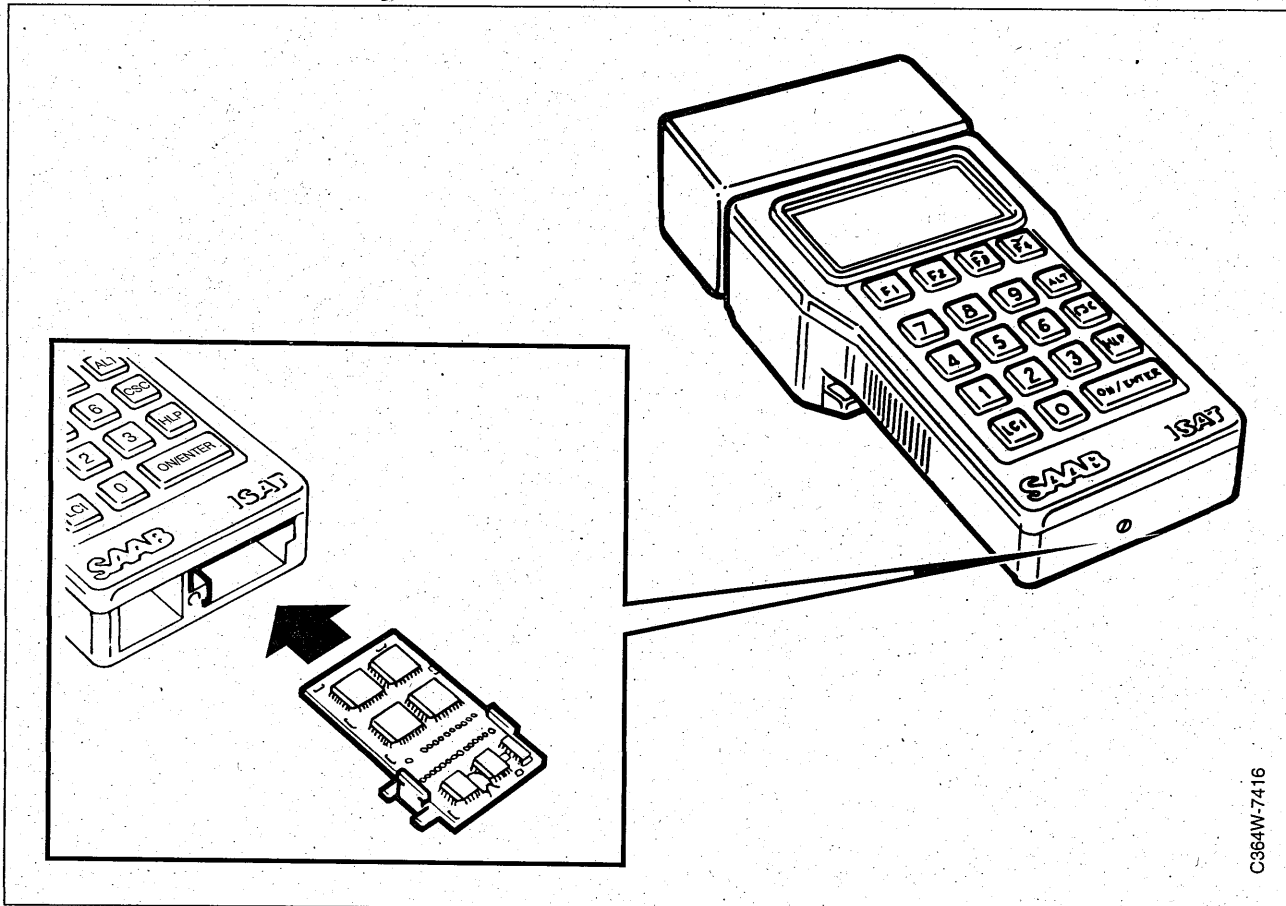
### Soldering

Wiring harnesses must not be soldered as this may cause a diagnostic trouble code to be generated.

### Components

The cable attached to components such as the oxygen sensor, various position sensors (camshaft, crankshaft) etc. must not be repaired. Change the entire component.

## New Flash memory module in the ISAT scan tool



C364W-7416

Before M1995, the memory capacity of the EPROM was used to about 75%. The new systems for M1996 (mainly OBDII) showed the existing memory capacity to be insufficient. Therefore, a new memory module is to be introduced ahead of M1996, with the following characteristics.

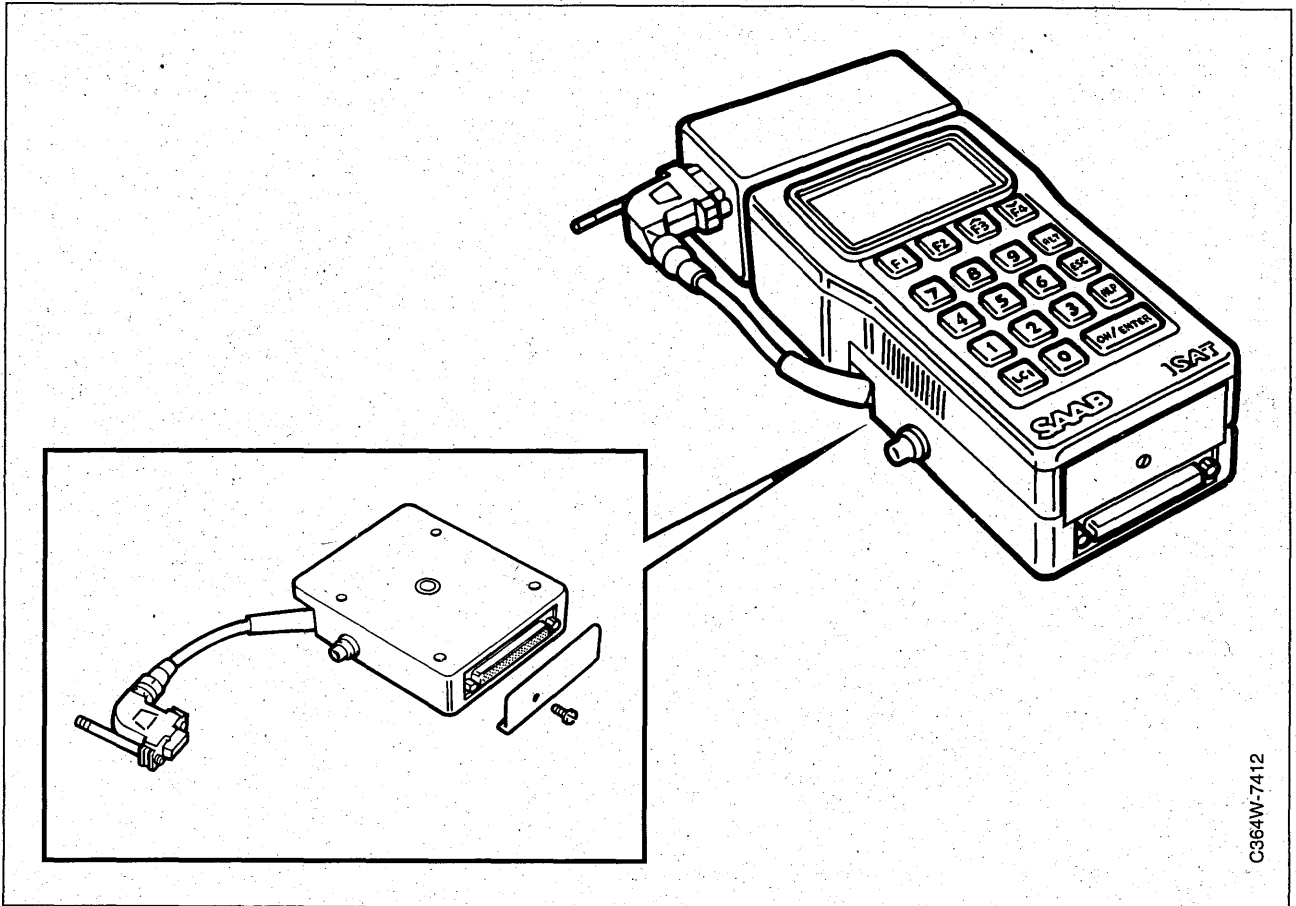
- Electrically erasable and programmable ROM (EEPROM). The memory module can be reprogrammed when fitted in the ISAT scan tool.
- The current exchange routines for EPROM no longer apply.
- New software will be distributed on a 3 1/2" diskette.
- Reprogramming can be carried out in three ways.
  - 1 Programming from ISAT scan tool to ISAT scan tool. One ISAT is the "master" and contains the new software.
  - 2 Programming from PC to ISAT scan tool. The PC is the "master" and contains the new software which is distributed on 3 1/2" diskette.
  - 3 Programming via modem. Updating takes place via a modem from a central unit which is the "master".
- ISAT scan tool and SIM (Saab Interface Module) software is integrated in the same memory module.

### Important

The Flash memory module is extremely sensitive to electrostatic discharge (ESD). Be extremely careful during handling.



## SIM ( Saab Interface Module)



C364W-7412

The SIM has been developed for use in combination with other ISAT scan tool features in order to facilitate fault diagnosis in electrical systems. The SIM can currently be used with all engine management systems for both the Saab 900 and Saab 9000, except cars for the US market with OBDII. The SIM software is integrated in the ISAT scan tool Flash EPROM. This means that future upgrades will be possible without changing the EPROM.

### Automatic test

Reads the pins in the pre-programmed control module in logical order. Sampling speed between the pins is less than 10 milliseconds.

### Manual test

Reads in the same way as the automatic test, but with manual control, meaning that any pin can continuously monitored. The result is displayed as a maximum reading, minimum reading and actual reading in volts, pulse time or frequency, depending on the pin being measured.

### Breakout test

Simultaneously reads any three pins in the control module or three different units on the same pin; voltage, frequency or pulse time/pulse ratio.

### Running test

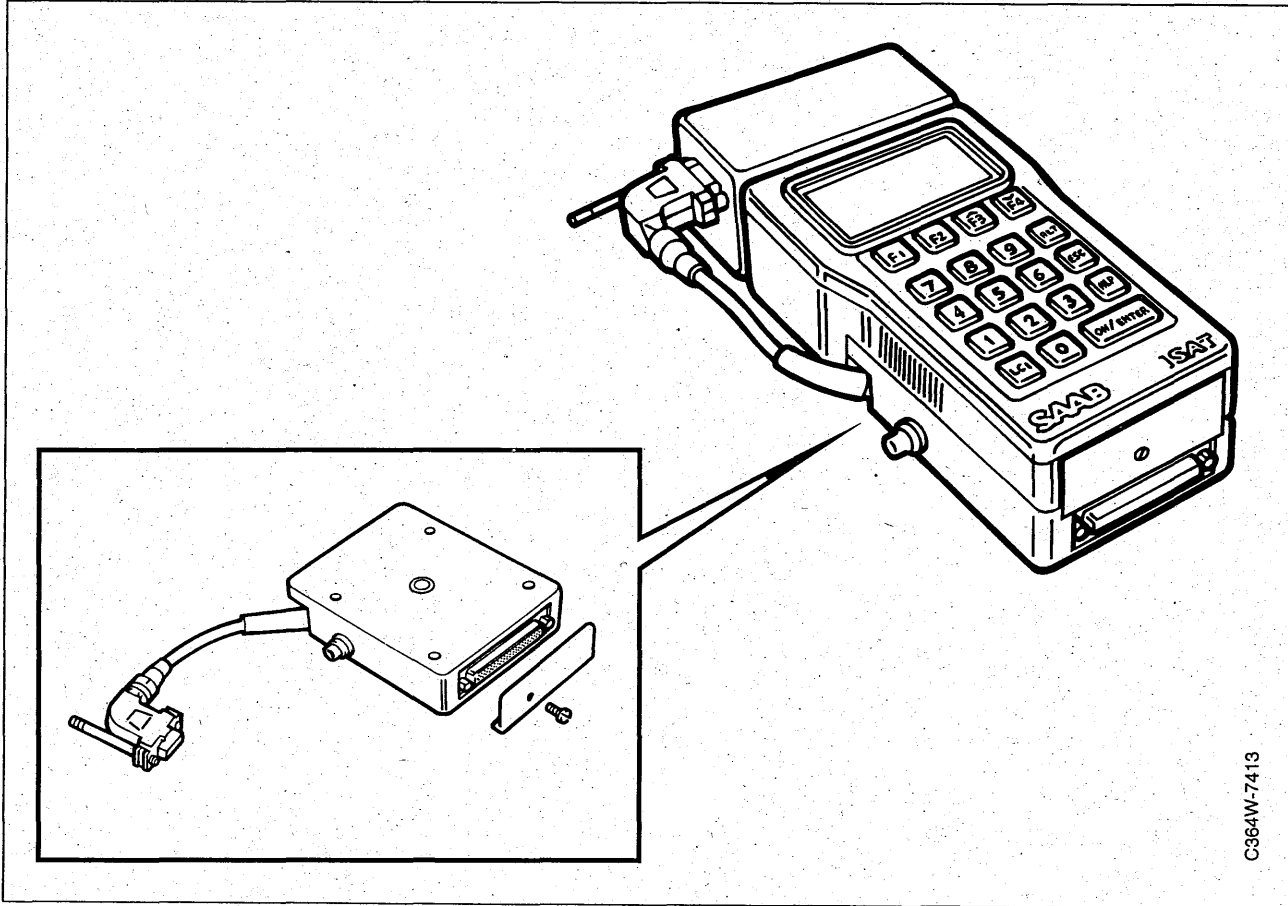
Automatic running test of control module pins during a test drive in order to detect intermittent faults.

### Active test on grounding points

A fast automatic feature for testing grounding points to battery negative.

### System information test

Continuously measures four pre-programmed parameters. These parameters are selected by the mechanic before each test.

**SIM (contd.)****Multimeter feature**

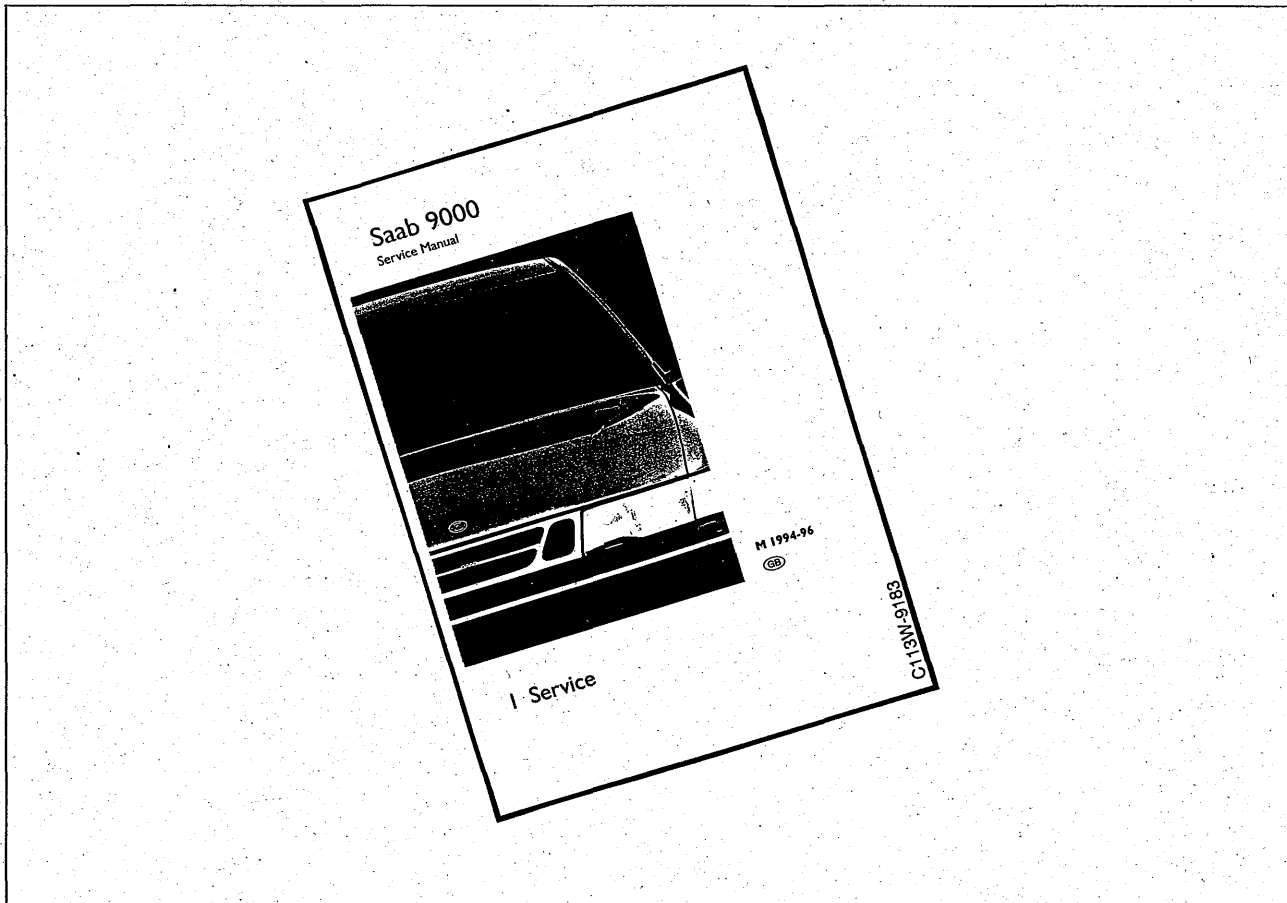
A complete multimeter feature is included in the software. This has a calibration feature for accuracy comparable with commercially available multimeters.

**Printout feature**

A printer can be coupled for hard copies of the test results.



# Service



Group 1 of the Service Manual, Service, has been updated to include the Saab 9000 M1994, M1995 and M1996.

The manual now includes three service programmes, called EU, PA and FE/ME programmes.

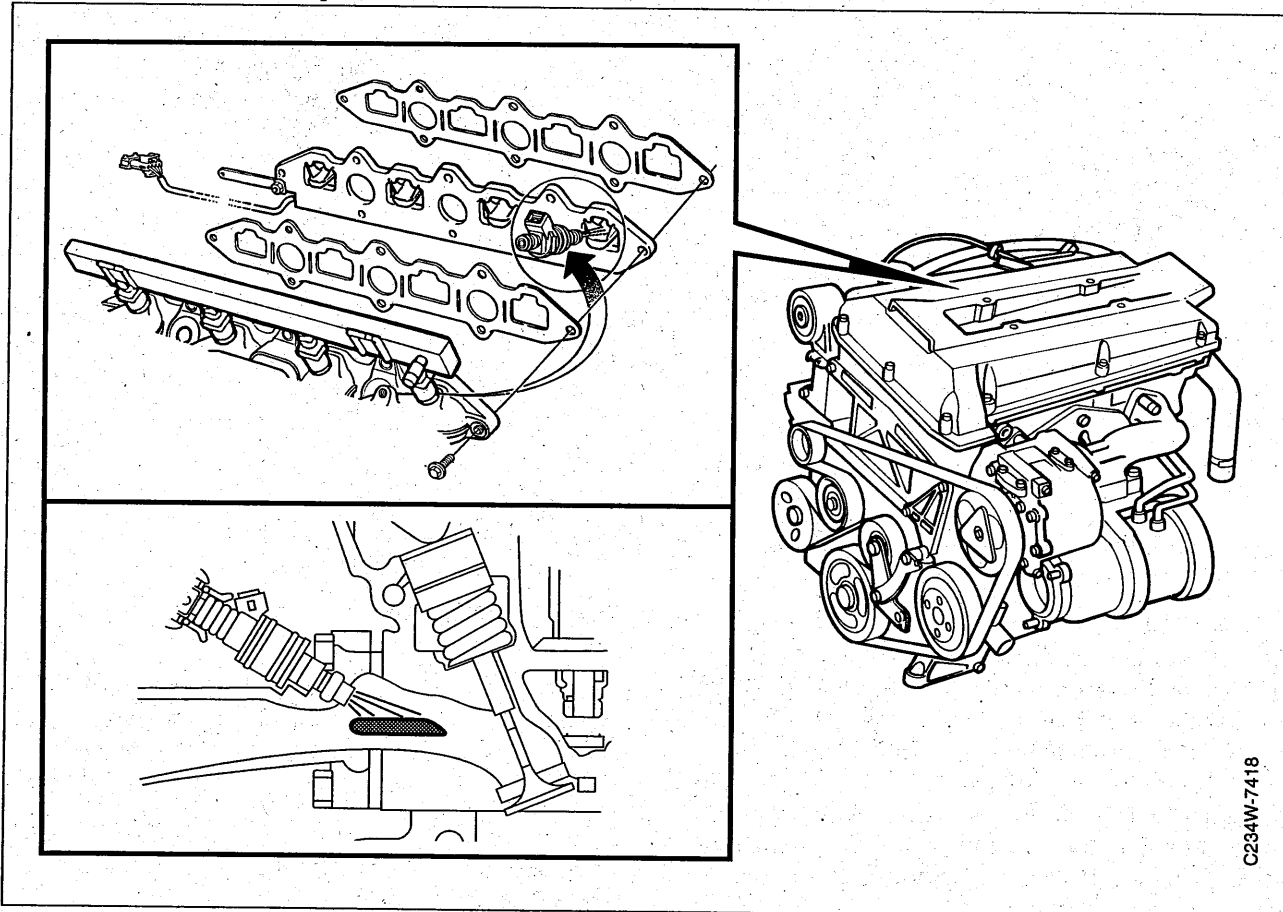
- The EU programme recommends the first service at 10,000 km and then every subsequent 20,000 km.
- The PA programme recommends the first service at 15,000 km and then every subsequent 15,000 km.
- The FE/MA programme recommends the first service at 10,000 km and then every subsequent 10,000 km.



# Engine

Intake air heat plates . . . . .	11	Engine management systems . . . . .	15
Low pressure turbo . . . . .	14		

## Intake air heat plates



C234W-7418

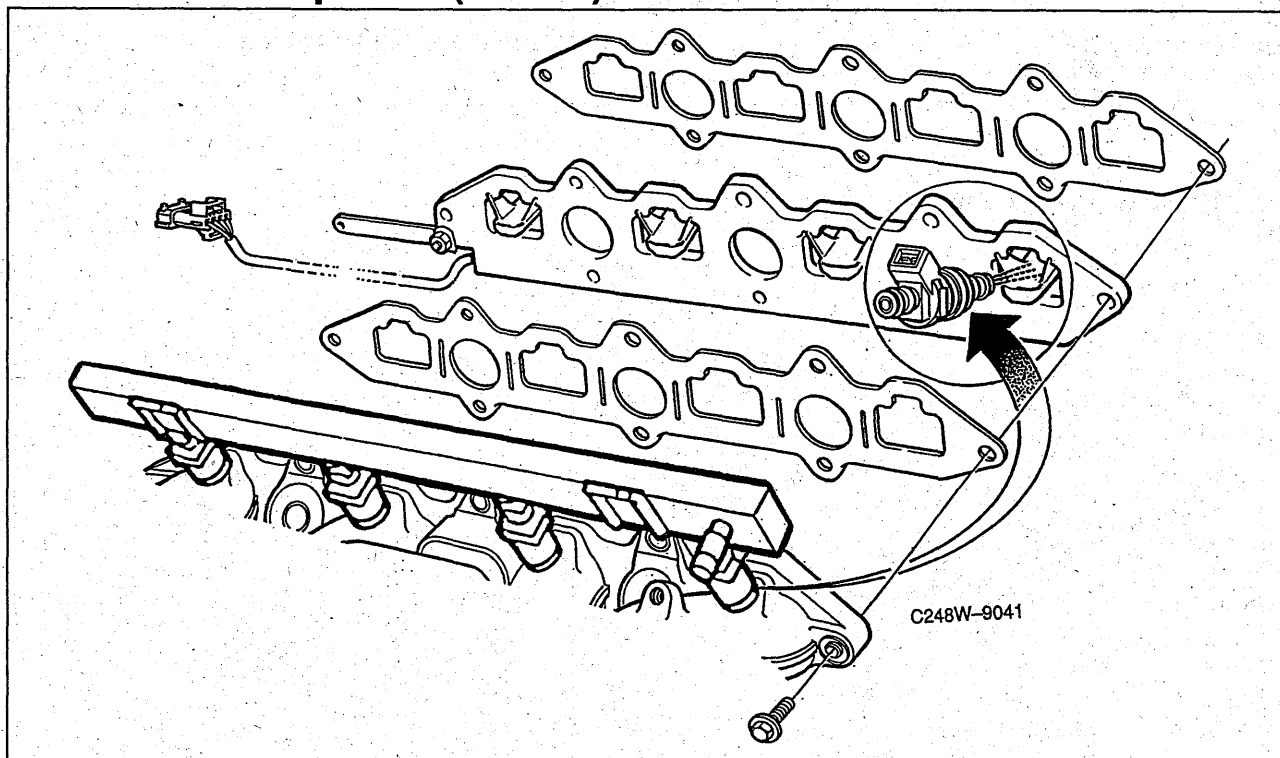
### General

In order to further minimize exhaust emissions and to comply with certain emissions requirements, there are low emission versions of the 2.3 litre turbo engines. This version has intake air heat plates in the intake manifolds.

### Fault diagnosis

There is no diagnostic trouble code for the intake air heat plates. This means that fault diagnosis can only be carried out manually using a multimeter.

## Intake air heat plates (contd.)



### Description

The engines are equipped with an intake air heat plate in each intake manifold. The four intake air heat plates are integrated in one unit, mounted between the intake manifold and the cylinder head.

The function of the intake air heat plates is to vapourize the injected fuel while the engine is warming up, reducing the need for fuel enrichment, and therefore also reducing emissions of harmful substances in the exhaust.

If engine coolant temperature is below 85°C (185°F) when the engine is started, the control module grounds pin 29, activating the relay for the intake air heat plates (relay position D in the engine compartment electrical distribution box). +30 voltage is then supplied from a 60A maxi fuse (number 1), via the relay, to the intake air heat plates. Both the fuse and the relay are mounted on the fuse board in the engine compartment.

The intake air heat plates have a common ground directly in the engine. Heating of the intake air heat plates ceases when engine coolant temperature exceeds 85°C (185°F) or four minutes after the engine is started.

If there is a fault in the intake air heat plates or an open circuit, drivability may be affected while the engine is warming up.

### Boost pressure

	Without intake air heat plates	With intake air heat plates
<b>B234L</b>		
Manual gearbox	0.90 bar	0.90 bar
Automatic transmission	0.70 bar	0.68 bar
<b>B234R</b>		
Manual gearbox	0.91 bar	0.92 bar

All values apply at 3500 rpm (man.) or 4000 rpm (aut.) and with an air temperature of 20°C, meaning that this is not the maximum boost pressure that can occur for short periods when driving.

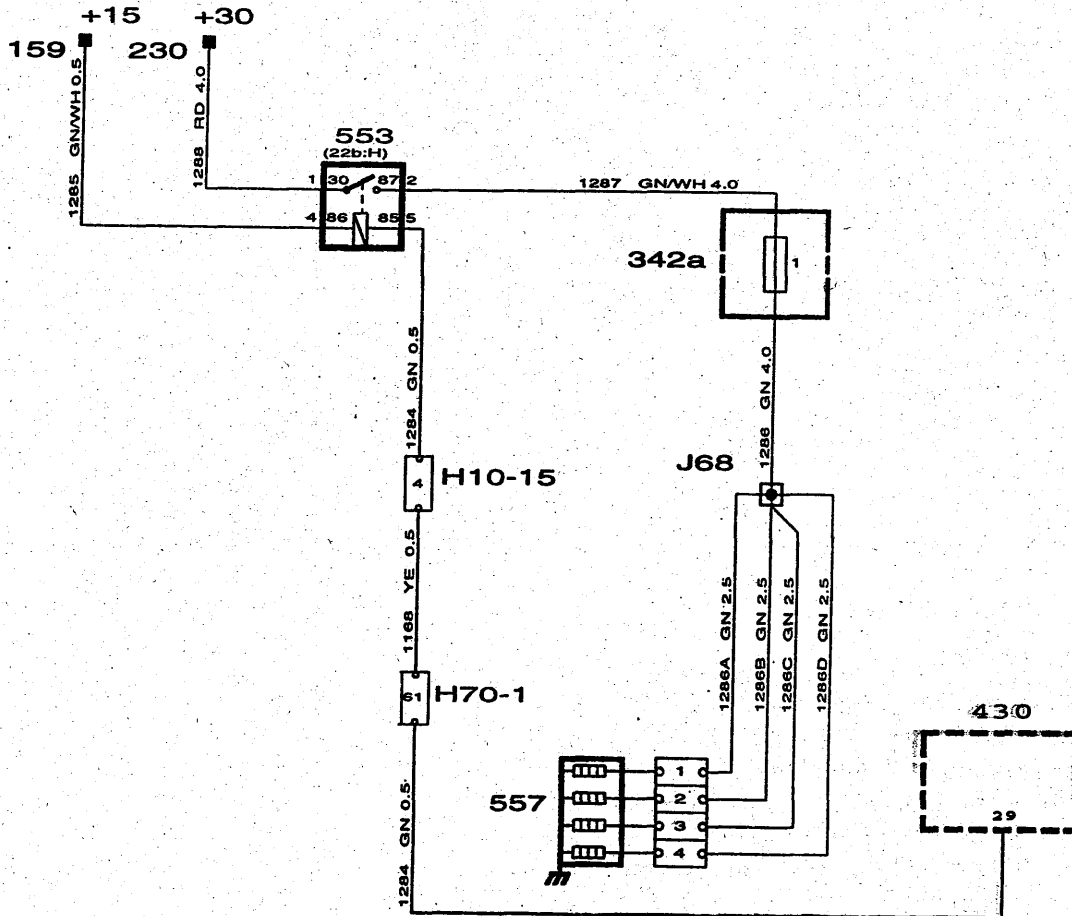
The Trionic control module for these cars has a special spare part number.

### Removal and fitting

See Service Manual 2:3 "LH Multiport Fuel Injection System", pages 199 and 200.

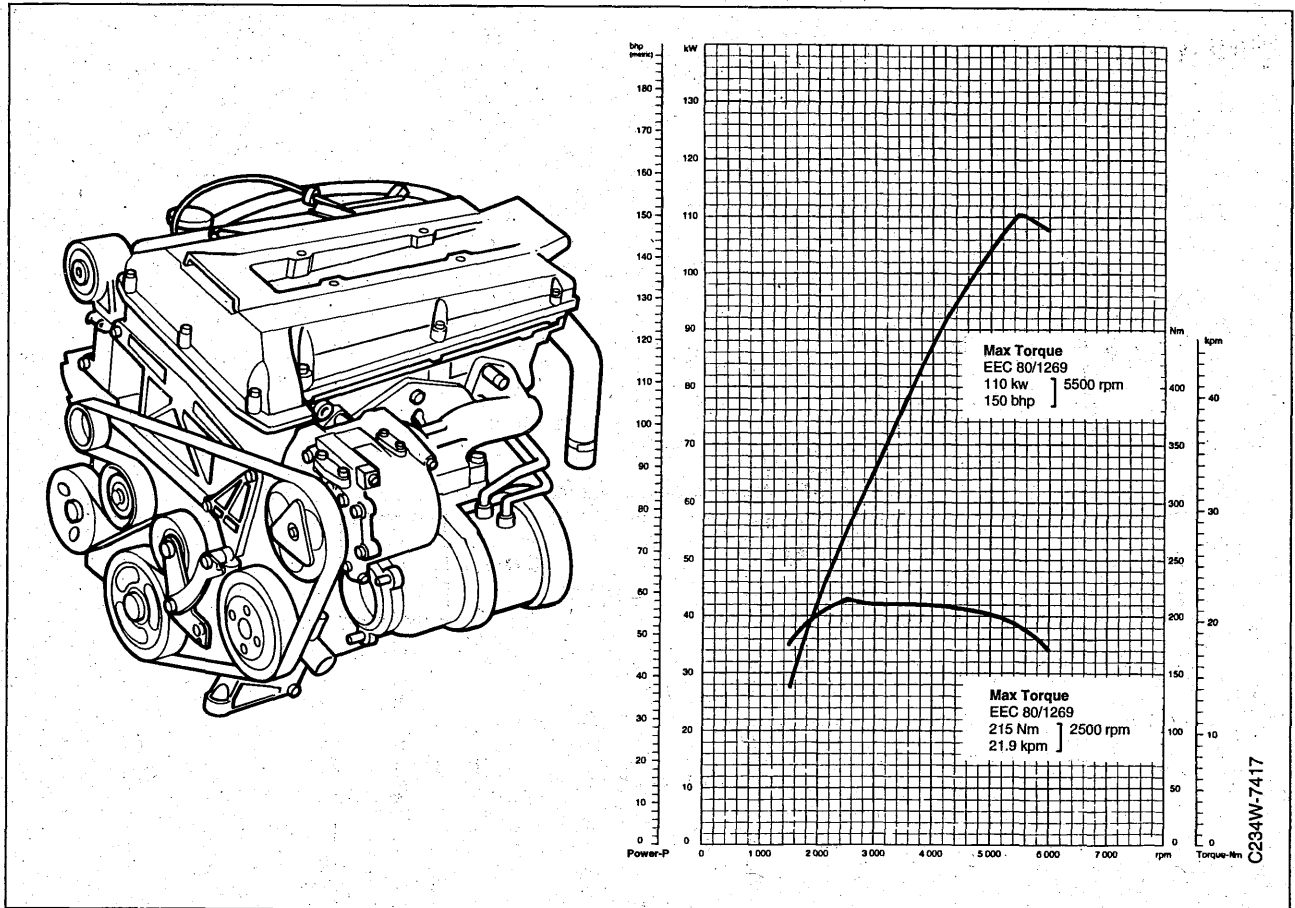
# Intake air heat plates (contd.)

## Wiring diagram



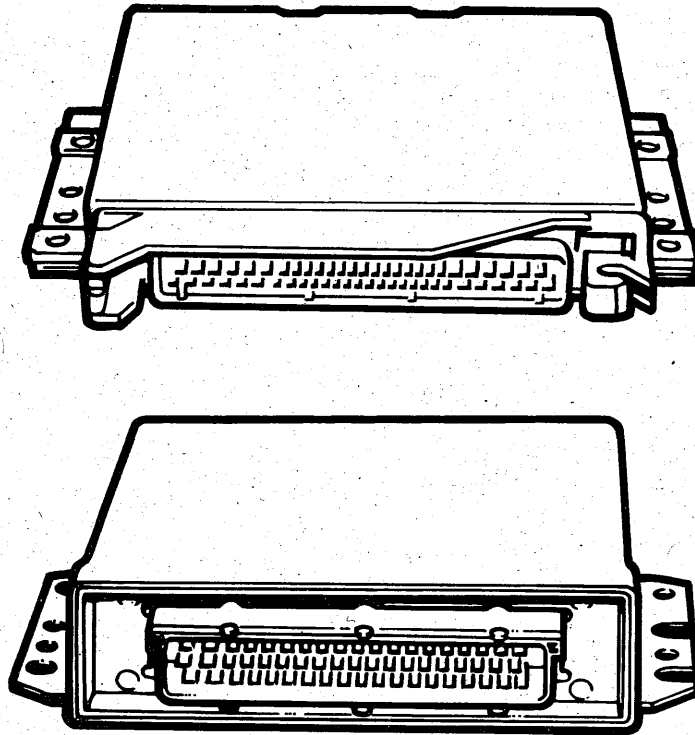


## Low pressure turbo



A low pressure turbo version of the 2.0 litre turbo engine equipped with charge air cooler (B204E) replaces the low pressure turbo version of the 2.0 litre turbo engine without charge air cooler (B204S). The B204E is equipped with a charge air cooler, but has no charge air control (APC system). Output is 110 kW/150 hk at 5500 rpm and torque is 215 Nm/21.9 kpm at 2500 rpm.

## Engine management systems



C234W-7415

### Saab Trionic

In the US market, the Saab 9000 is equipped with an adapted version of the Trionic system to comply with OBDII requirements.

Compared with earlier versions, there is now monitoring of the three way catalytic converter, misfiring and the EVAP system.

For further information, see Service Manual 2:7 "Trionic Engine Management System (OBDII)"

### Motronic 5.2

In the US market, the Saab 9000 with the V6 engine is equipped with the Motronic 5.2 engine management system, adapted for OBDII.

Compared with earlier engine management systems, there is now monitoring of the three way catalytic converters, misfiring and the EVAP system.

For further information, see Service Manual 2:7 "Motronic 5.2 Engine Management System (OBDII)"



# Electrical system

New component numbering . . . . . 17  
Repositioned data link connector . . . . . 21

Anti-theft alarm with self-immobilization . . 22

## New component numbering

In order to further simplify fault diagnosis, components which are used in several locations in the car have had their additional letters changed. These show their location in the car more directly.

C	Centre
D	Driver side
F	Front
H	Hatch for luggage compartment
P	Passenger side, front
R	Rear
HL	Hatch Left
HR	Hatch Right
FL	Front Left
FR	Front Right
RL	Rear Left
RR	Rear Right
LH	Left-Hand side
RH	Right-Hand side

This means, for example, that the ABS wheel sensors are now designated 298FL, 298FR, 298RL and 298RR.

In order to avoid confusion with, for example, 47D, warning and indicator lamps are now designated with lower case letters, 47d. Other components which have had version designated with A, B and C now also have lower case letters e.g. 540a.

The introduction of the new additional letters has meant that a number of components have changed number in order to minimize the number of component numbers. The same number is now used for both the 900 and the 9000.

# 18 Electrical system

Changed component numbers are given in the following table:

SMS No. up to M95	SMS No. from M96
11	11FL
11	11FR
12	12FL
12	12FR
13	13FL
13	13FR
13	13RL
13	13RR
14	14RL
14	14RR
22A	22a
22B	22b
27	27FL
27	27RL
28	28FR
28	28RR
30	30RL
30	30RR
32	32HL
32	32HR
33	33RL
33	33RR
47A	47a
47B	47b
47C	47c
47D	47d
47E	47e
47F	47f
47G	47g
47H	47h
47I	47i
47J	47j
47K	47k
47L	47l
47M	47m
47N	47n
47O	47o
47Q	47q
47R	47r
47T	47t
47U	47u
47V	47v
47X	47x
47Y	47y

SMS No. up to M95	SMS No. from M96
50	50C
50	50R
51	50F
54	54D
54	54P
54	54RL
54	54RR
61A	61a
62	62F
62A	62R
64	64D
64	64P
66	66FL
66	66FR
69	69P
70	70D
71	70P
83a	83a
85	85FL
85	85FR
88A	88a
89	89LH
90	89RH
109	30RC
118	118FL
118	118FR
119	119FL
119	119FR
126	126D
127	126P
136	136a
136	136b
164	164D
165	164P
178	178a
178	178b
178A	516
184	184P
185	184RR
186	184RL
188	184H
190A	190RL
191A	190RR
193	194RL

SMS No. up to M95	SMS No. from M96
194	194RR
198	38
199	36
206	206a
206	206b
206	206c
206	206d
206	206e
206	206f
207	207D
207	207P
208	208D
208	208P
208	208RL
208	208RR
209	209D
209	209P
209	209RL
209	209RR
213A	213a
213B	213b
213C	213c
213D	213d
213E	213e
213F	213f
213G	213g
213H	213h
213I	213i
213J	213j
225left	225LH
225right	225RH
228A	228a
228B	228b
234	234FL
234	234FR
235A	236D
235B	236P
236A	236D
236B	236P
247	247RL
248	247RR
252	252D
253	252P
255	254D
254	254P

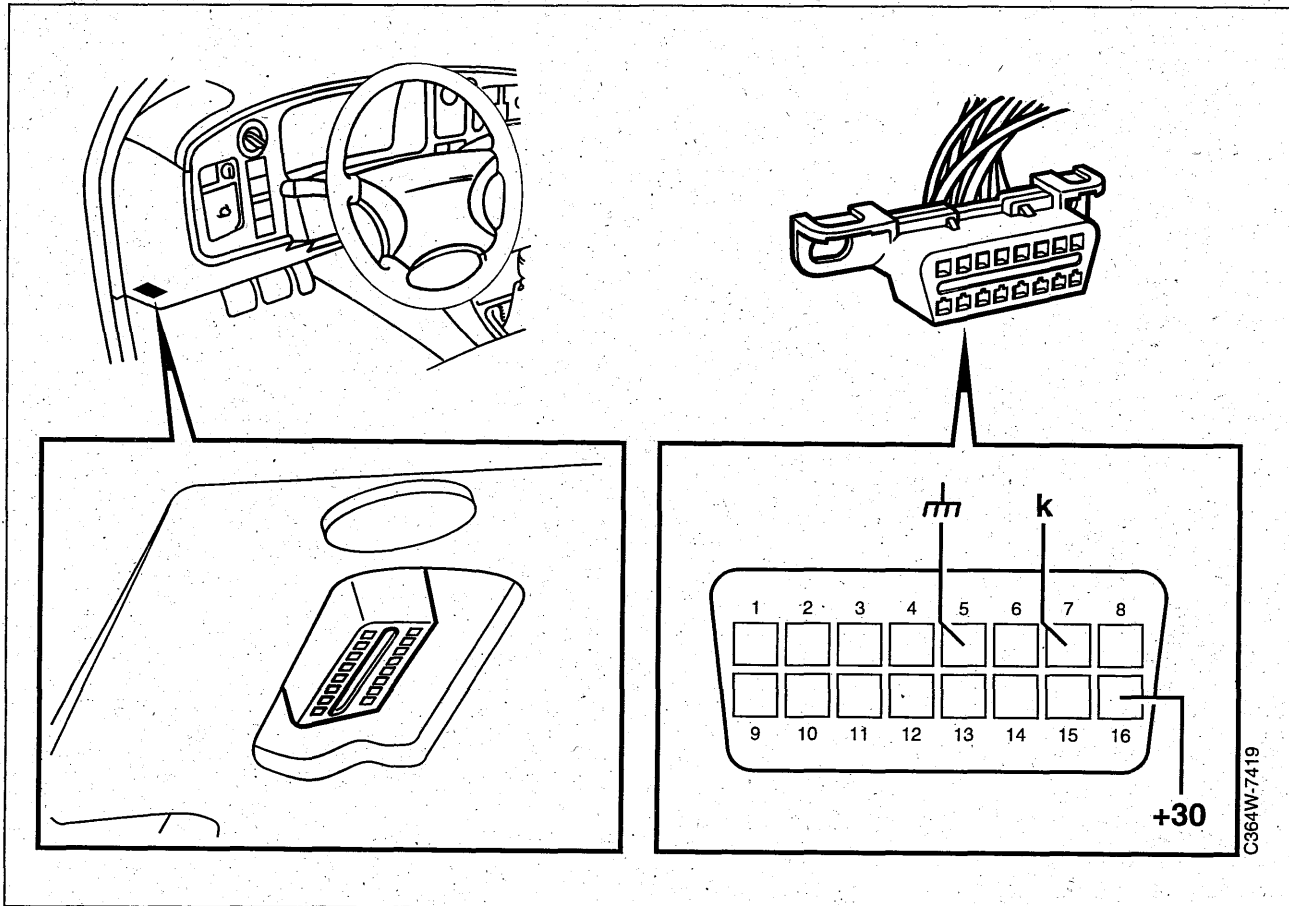
SMS No. up to M95	SMS No. from M96
266	266FL
266	266FR
266	266RL
266	266RR
280	280FL
281	280FR
298A	298FL
298B	298FR
298C	298RL
298D	298RR
302A	302a
302B	302b
303A	303a
303B	303b
333A	333D
333B	333P
342A	342a
342B	342b
349	353
350	353
351	354
353A	353
353B	353
353C	353
357	357D
357A	357Da
357B	357Db
357C	357Dc
357D	357Dd
357E	357De
357F	357Df
357G	357Dg
357H	357Dh
357J	357Dj
357K	357Dk
358	357P
358A	357Pa
358B	357Pb
358C	357Pc
358D	357Pd
359	359LH
360	359RH
366	37
373	373LH
374	373RH

SMS No. up to M95	SMS No. from M96
436	184D
446	446D
447	446P
450	415
513	512RL
512	512RR
514	514a
514	514b
518	449
524	324
526	532
536	439
540A	540a
540B	540b
541A	541a
541B	541b
548	326
549	325
560	52
561A	561LH
561B	561RH
562A	562LH
562B	562RH
563A	563LH
563B	563RH
564A	564LH
564B	564RH
571A	571LH
571B	571RH
574A	574LH
574B	574RH
582	456

The designation of components has also been altered and, where possible, has been made the same for the 900 and the 9000.

Later during the year model, the symbols will also be altered and be made the same for both car models.

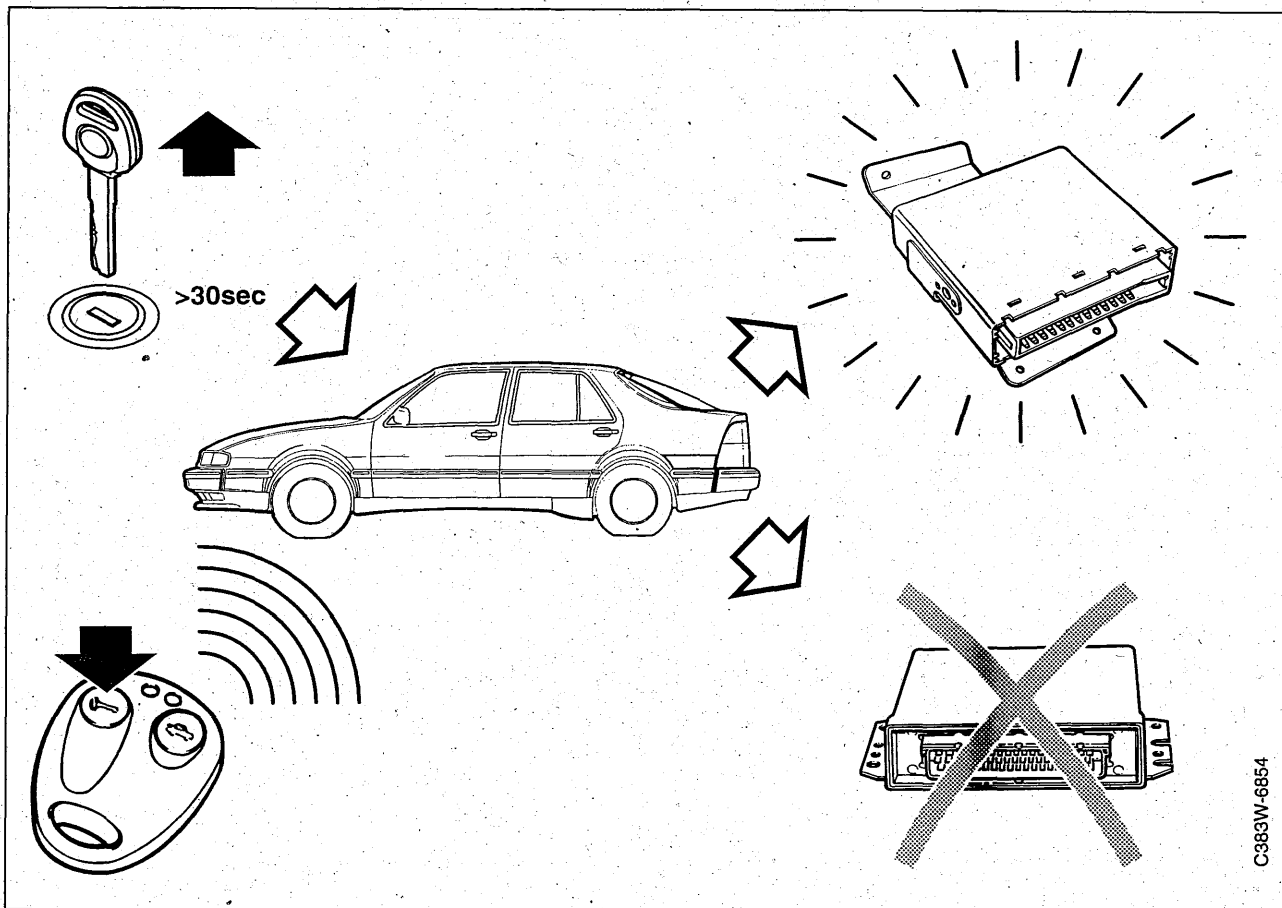
## Repositioned data link connector



The data link connector has been moved from the seat member to a position under the steering wheel and also has a new connector.



## Anti-theft alarm with self-immobilization



In the Saab 9000, year model 1996, there is now an improved anti-theft alarm with a self-immobilizing feature, for factory fitting to cars intended for the EU and SE markets.

Immobilization always prevents unauthorized starting of the car. When an attempt is made to start an immobilized car, the engine control module assesses, in conjunction with the anti-theft alarm, whether to allow starting.

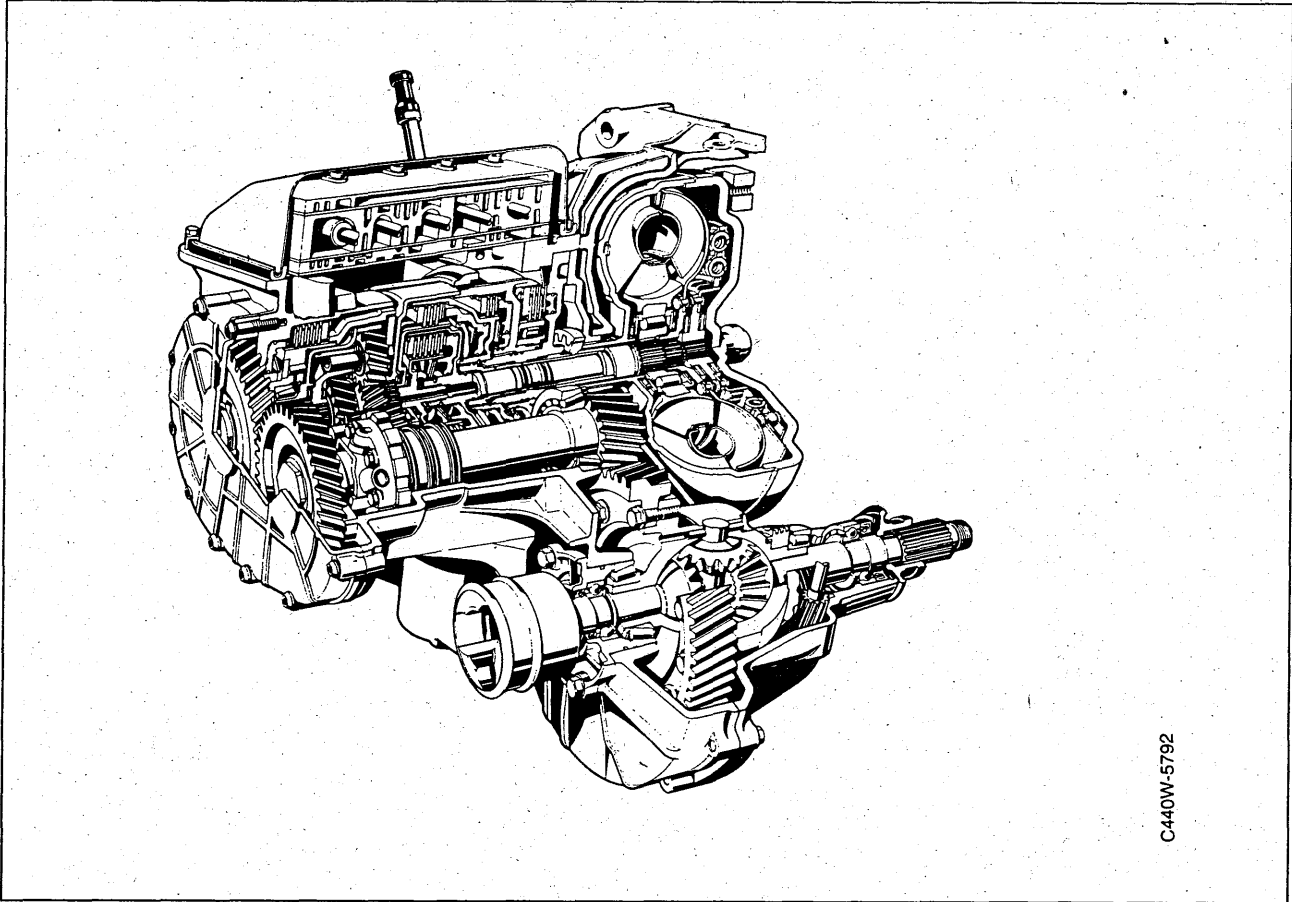
Immobilization is always automatic:

- **30 seconds** after the key is removed from the ignition switch (time can be altered by reprogramming).
- **3 minutes** after deactivation/unlocking if the key is not turned in the ignition switch.

# Transmission

Altered ratios . . . . . 23

## Altered ratios



C440W-5792

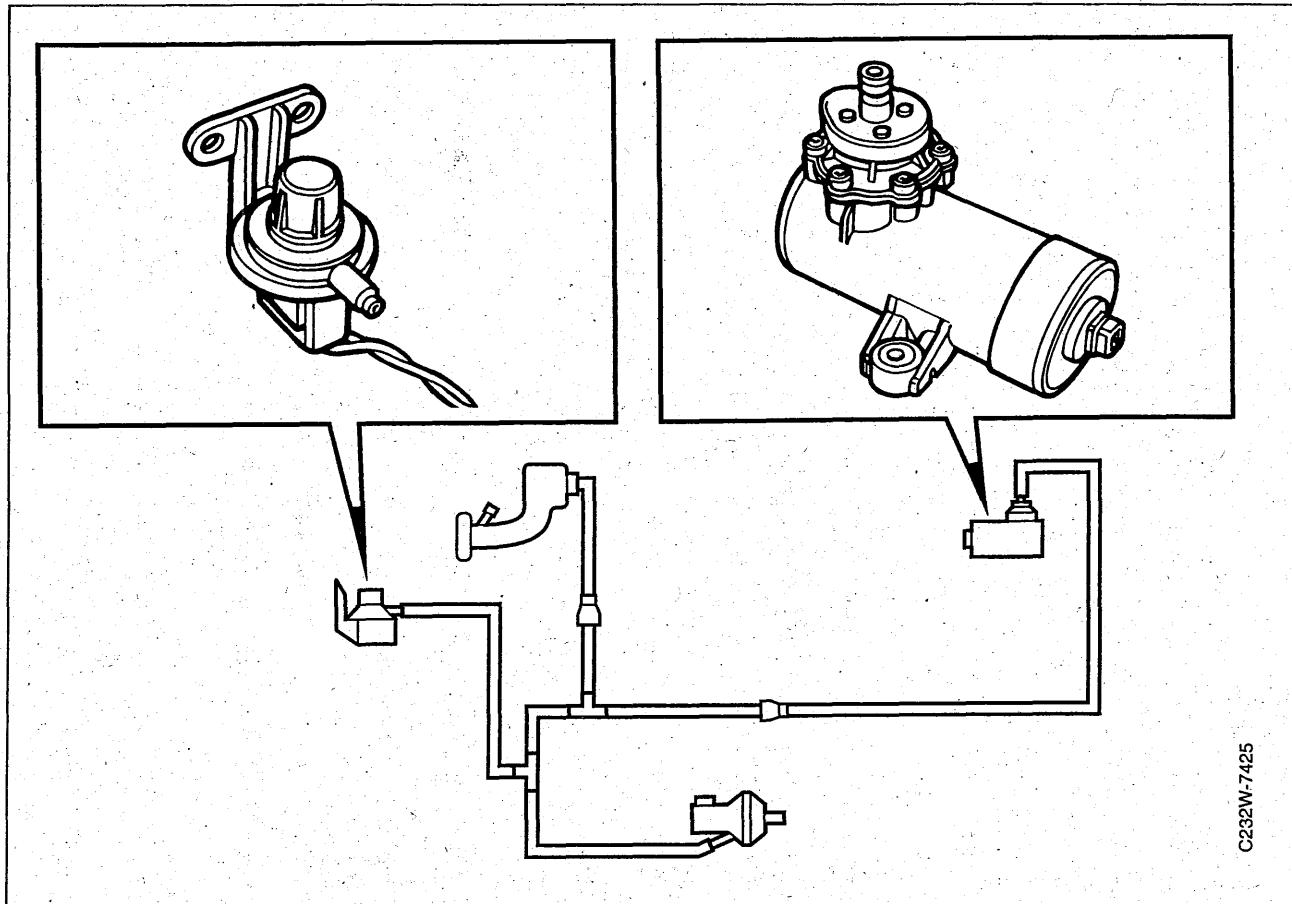
From M1996, the automatic transmission for the B308 engine has a new ratio, changed from A4E 44.5 km/h at 1000 rpm to A4N 40.5 km/h at 1000 rpm.



# Brakes

Vacuum pump . . . . . 25

## Vacuum pump



In order to further increase the braking capacity of the Saab 9000 2.0 LPT automatic, a vacuum pump has been introduced on year model M1996. This pump supplies the brake servo with vacuum in driving conditions where the engine is unable to fully cope with this.

The pump starts when vacuum is less than 0.35 bar and switches off at 0.4 bar.

In order for the pump to start, the following conditions must be met:

- Ignition on
- Vacuum as above

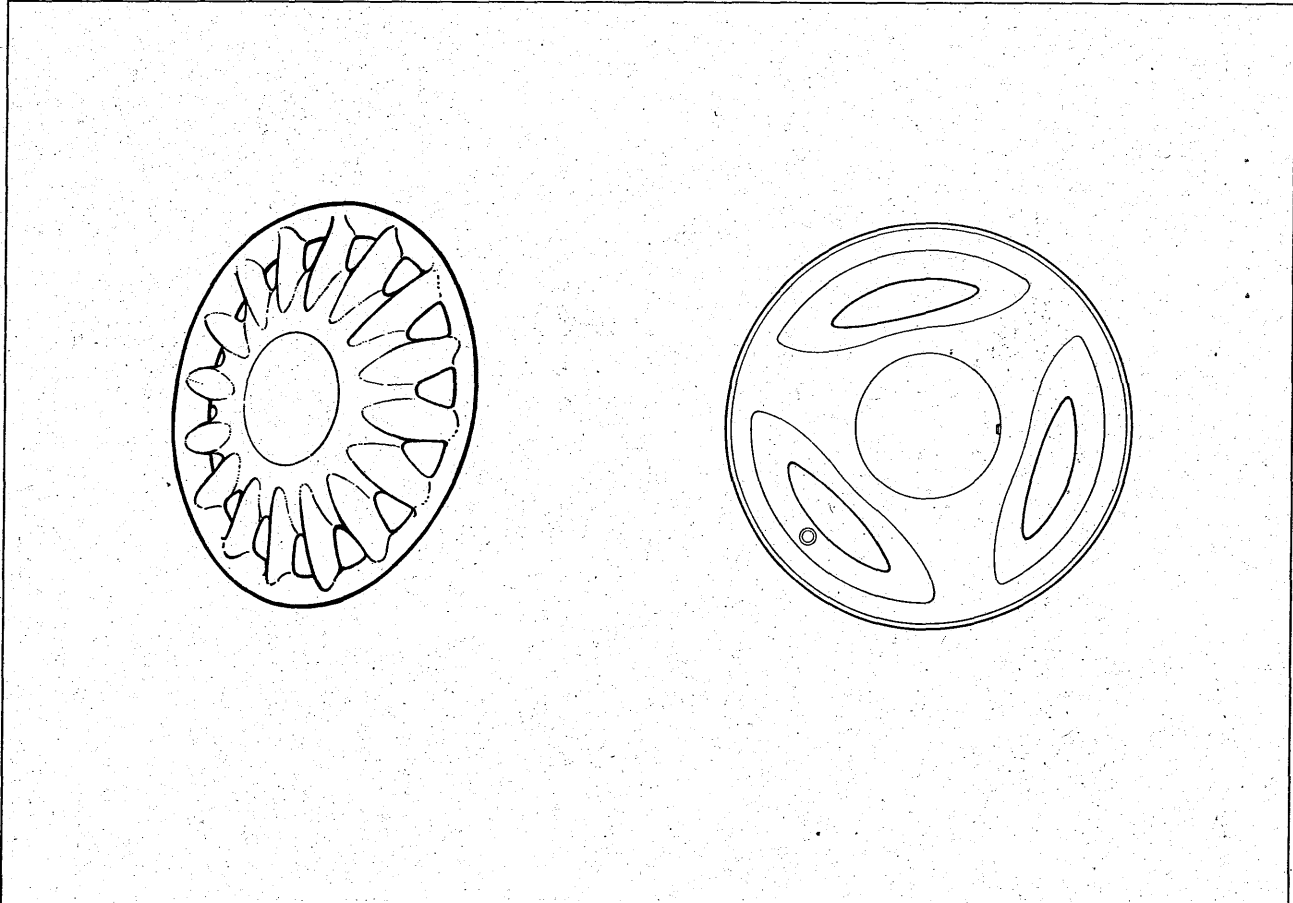
The pump is located on the rear of the engine against the bulkhead.



# Wheel suspension

Wheels . . . . . 27

## Wheels



A new plastic hub cap and a new alloy wheel have been introduced on the Saab 9000 M1996. The hub cap is introduced as standard on 9000s with pressed steel wheels. Alloy wheels will be available as a factory-fitted option.

The alloy wheels are of size 15" X 6".



## Body

Body colours . . . . .	29	New textile upholstery . . . . .	32
External door handle . . . . .	30	Cup holder . . . . .	33
Aero interior in CD Griffin . . . . .	31	Seatbelt with lockable belt tongue US/CA. . . . .	34

### Body colours

Two colours are new for M1996; Java Black and Sky Blue. Two colours are no longer used; Eucalyptus Green and Aubergine.

The current range of colours is given in the table below:

Colour code	Designation and colour	Type of paint	Remarks
153	Cirrus White	Solid	
170	Black	Solid	
198	Embassy Blue	Solid	
227	Citrine Beige	Base Paint	
229	Le Mans Blue	Base Paint	
230	Scarab Green	Base Paint	
240	Imola Red	Solid	
242	Ruby Red	Base Paint	
247	Silver	Base Paint	
252	Sky Blue	Base Paint	New colour
253	Java Black	Base Paint	New colour

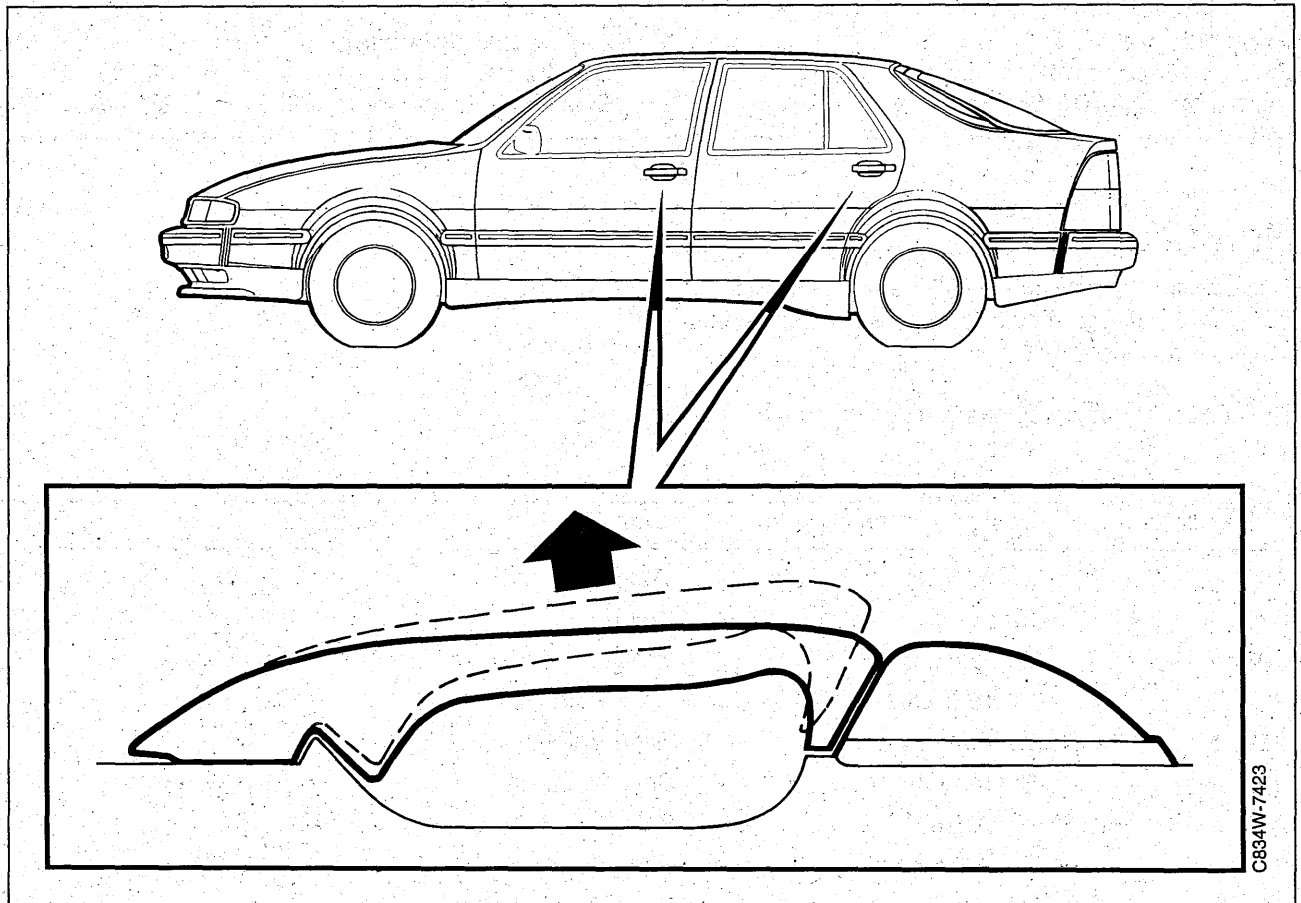
The Saab 9000 Aero is only available in the following colours:

- Imola Red
- Black
- Silver
- Le Mans Blue
- Scarab Green

All Saab 9000s from M1996 have bumpers painted in the same colour as the body.

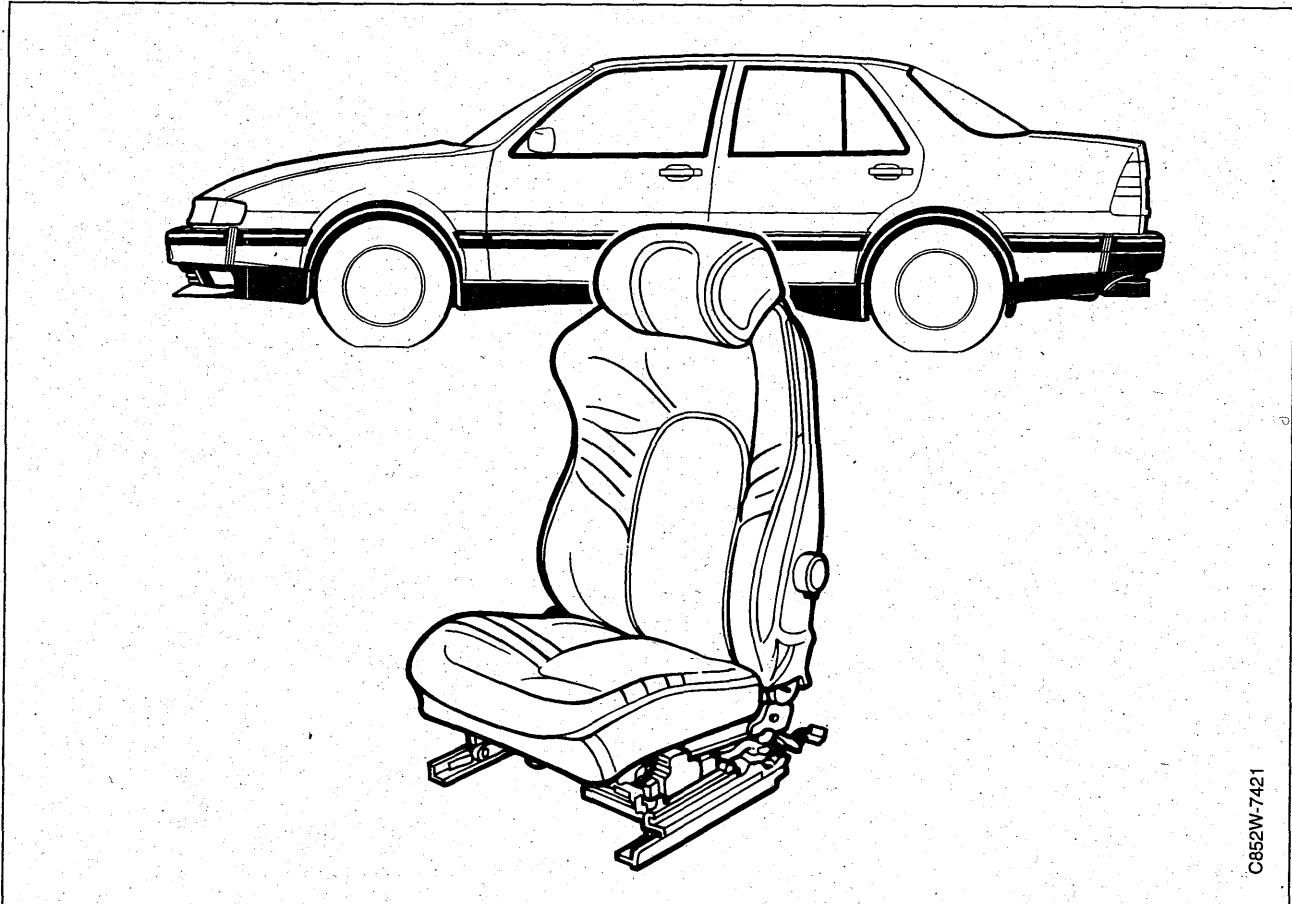


## External door handle



New external door handles are introduced from M1996. The door handles are designed to better fit the hand so that leverage is greater when opening. This means that the new handle requires less force when opening the door.

## Aero interior in the Griffin

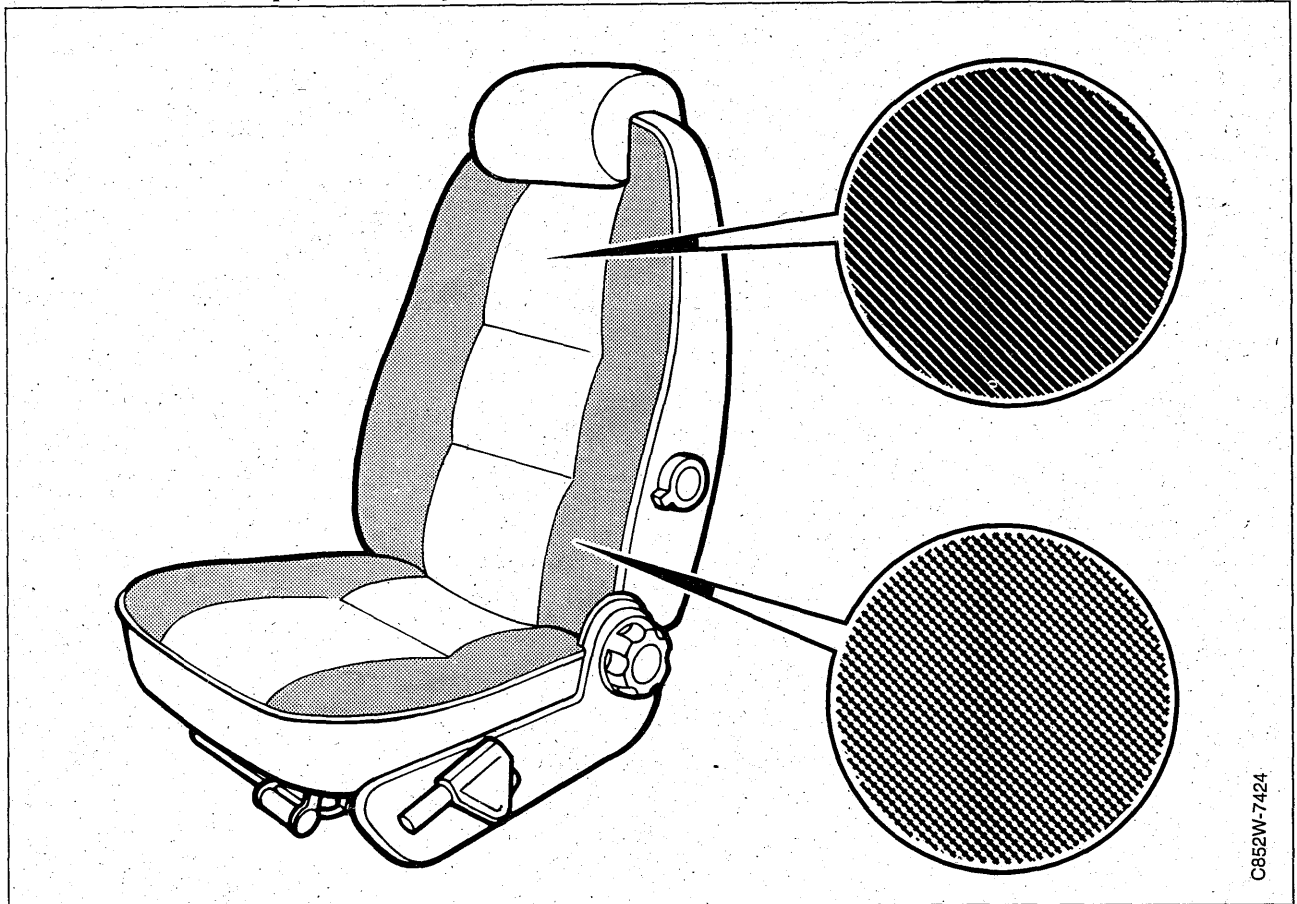


C852W-7421

From M1996, the Saab 9000 Griffin has front and rear seats of the same design as the Saab 9000 Aero.

The rear seat has a one-piece backrest with a loading hatch and the seat cushion is of the same full foam type as other Saab 9000s. Only the Saab 9000 Aero still has a spring compartment seat cushion.

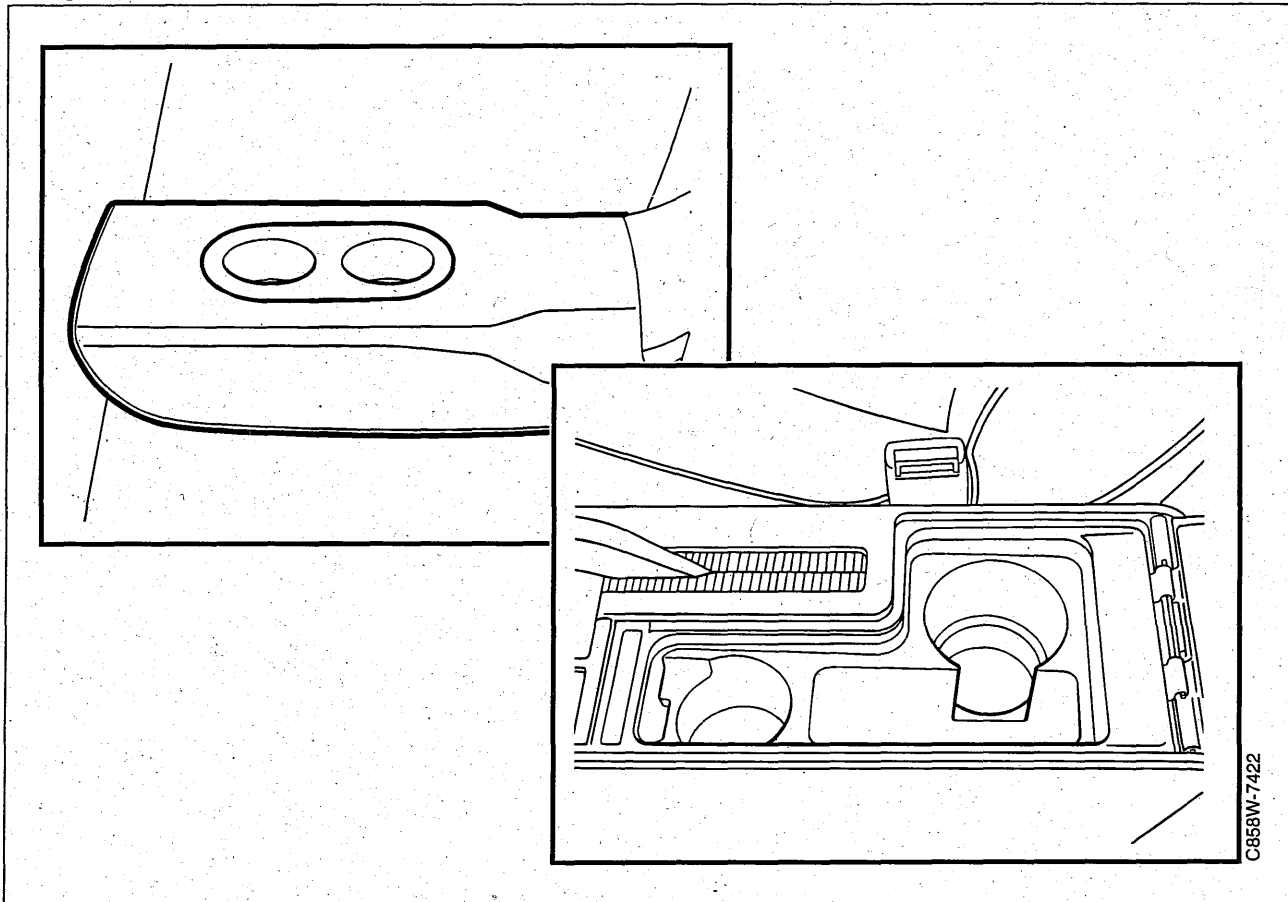
## New textile upholstery



C852W-7424

From M1996, the textile upholstery "Horizon" is replaced with new upholstery, called "Profile". In the centre, this has a finer weave of plush and at the sides, a thicker luxury plush from the Saab 900.

## Cup holder



### Rear cup holder

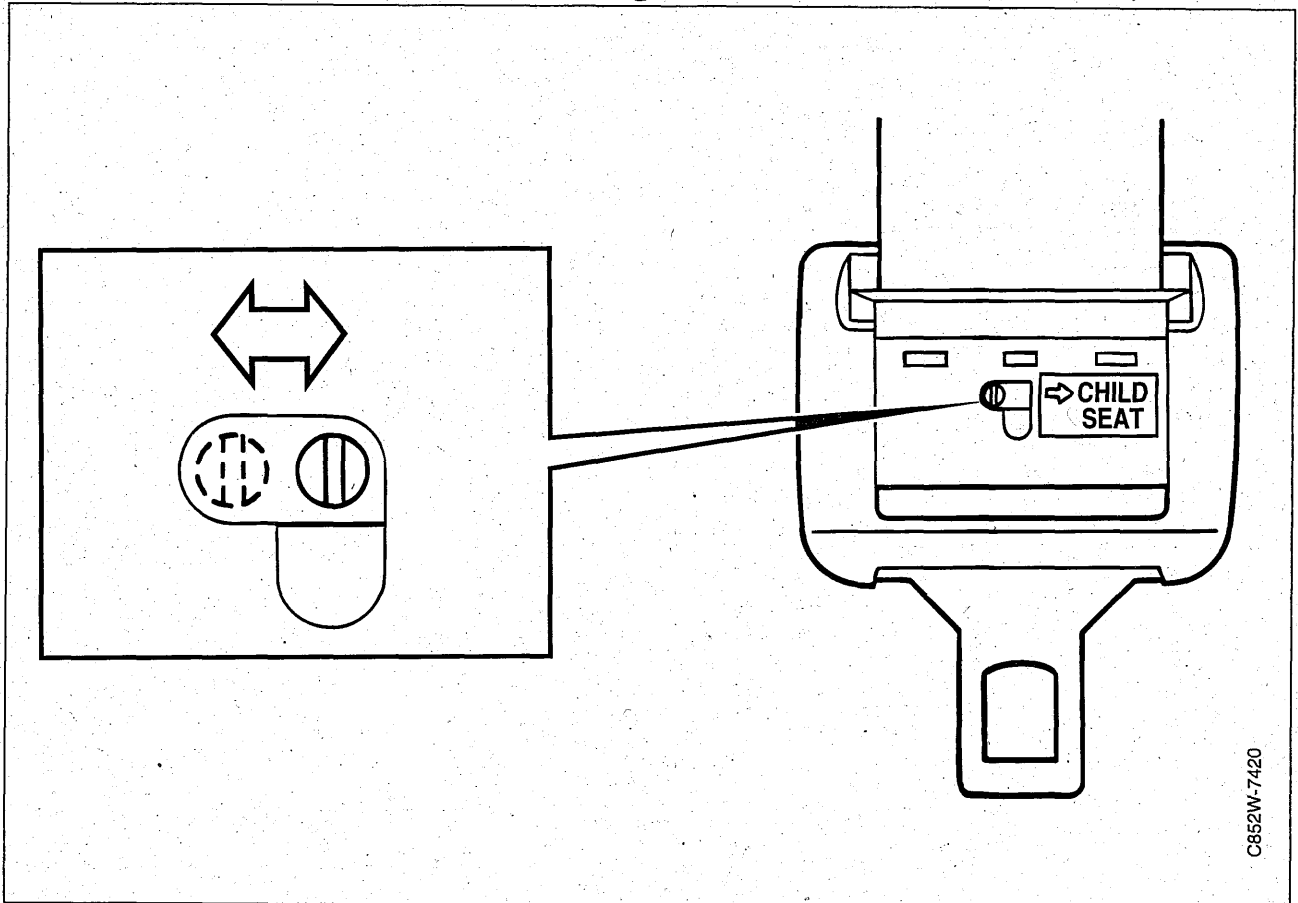
The rear cup holder, with space for two cups, is built into the rear arm rest and is accessible when the arm rest is folded down.

### Front cup holder

The front cup holder is located in the storage compartment in the centre console between the front seats. The cup holder is designed as an insert and can be removed when not in use. It has two recesses for two cups.

The front cup holder will not be introduced at the time of model introduction, but will be introduced as standard in the beginning of 1996.

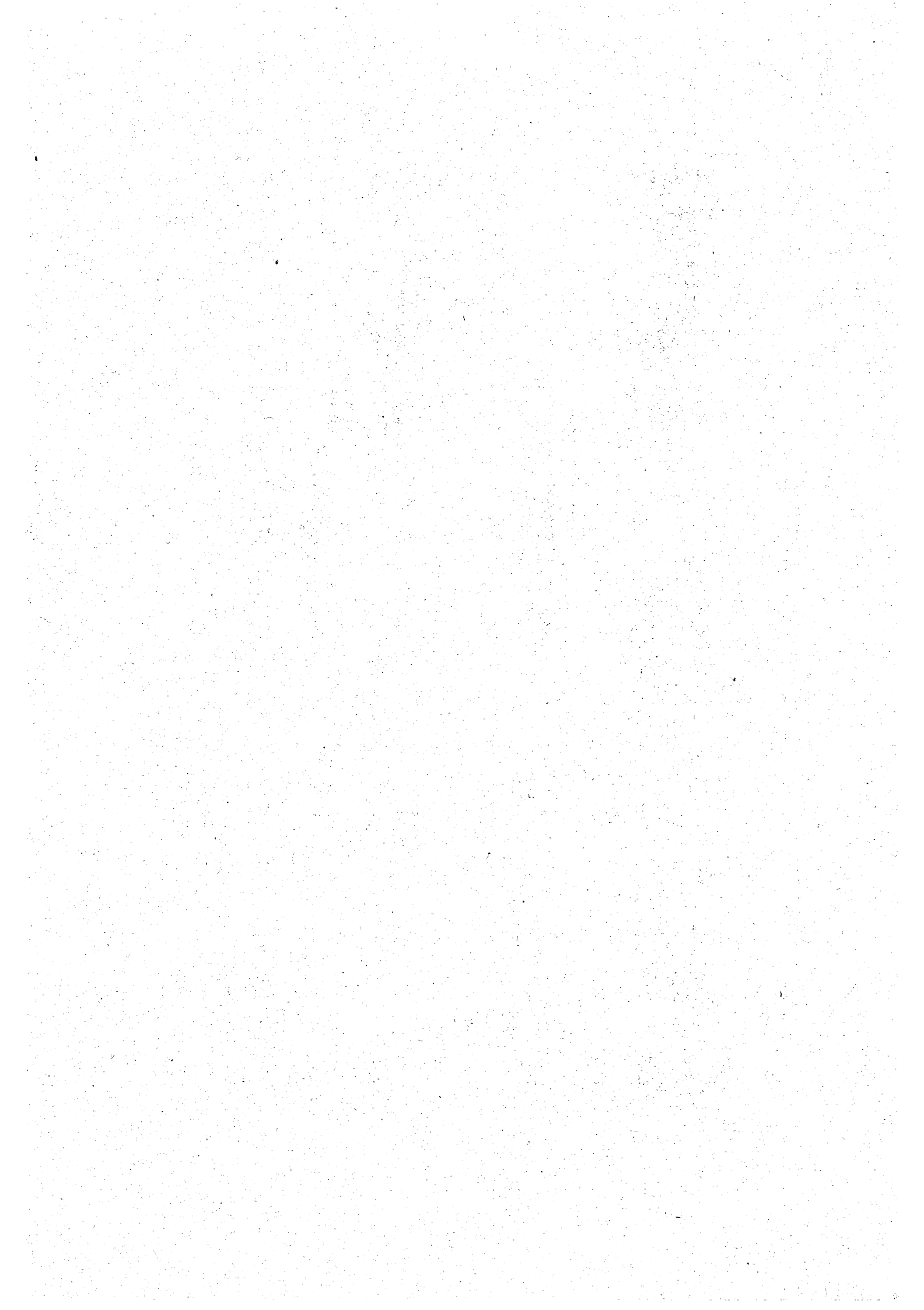
## Seatbelt with lockable belt tongue USA/Canada

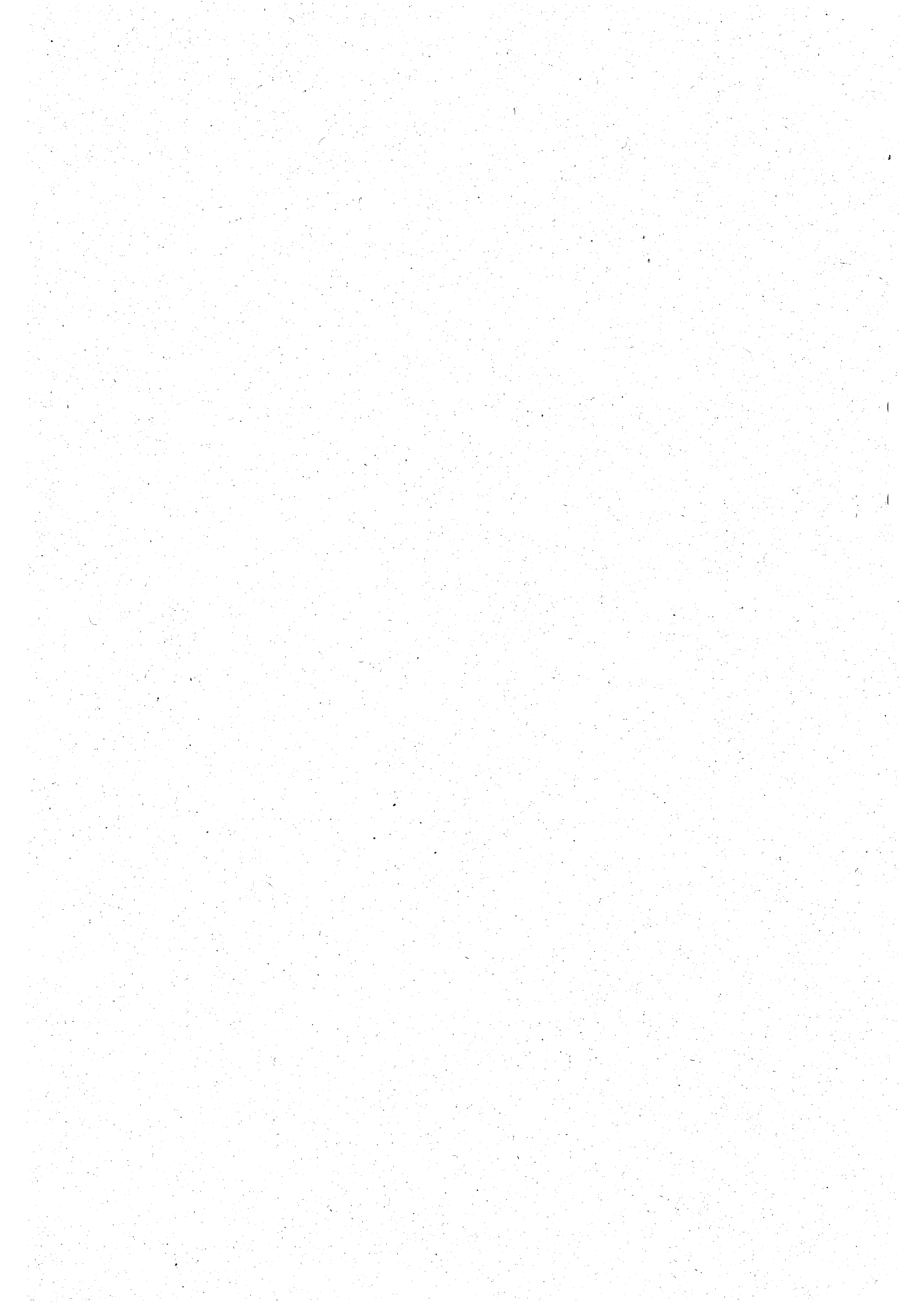


Due to legal requirements, a lockable belt tongue has been introduced to all seatbelts in the car.

This is used when fitting a child seat in the car so as to be able to secure the child seat using the lap belt.

The lock is secured by moving the switch to the "CHILD SEAT" position. The lap belt is then fitted around the child seat and tensioned by pulling on the shoulder strap.









# Workshop Information

## User feedback

To

From

Saab Automobile AB  
Workshop Information, MLVI  
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Comments/suggestions

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Manual concerned: .....

It is important that Saab technicians in the field regard the Workshop Service Manual as their bible, and we therefore strive to make the manual easy to use and to provide accurate information.


By letting us have your views on this manual you will be helping us to maintain a high standard in our literature.

Note down any comments or suggestions you may have on a sheet of paper or take a copy of this page and send us your views at the above address. For greater convenience, you are also welcome to send your comments by fax, using the telephone number shown.



**SAAB**

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Trollhättan, Sweden

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