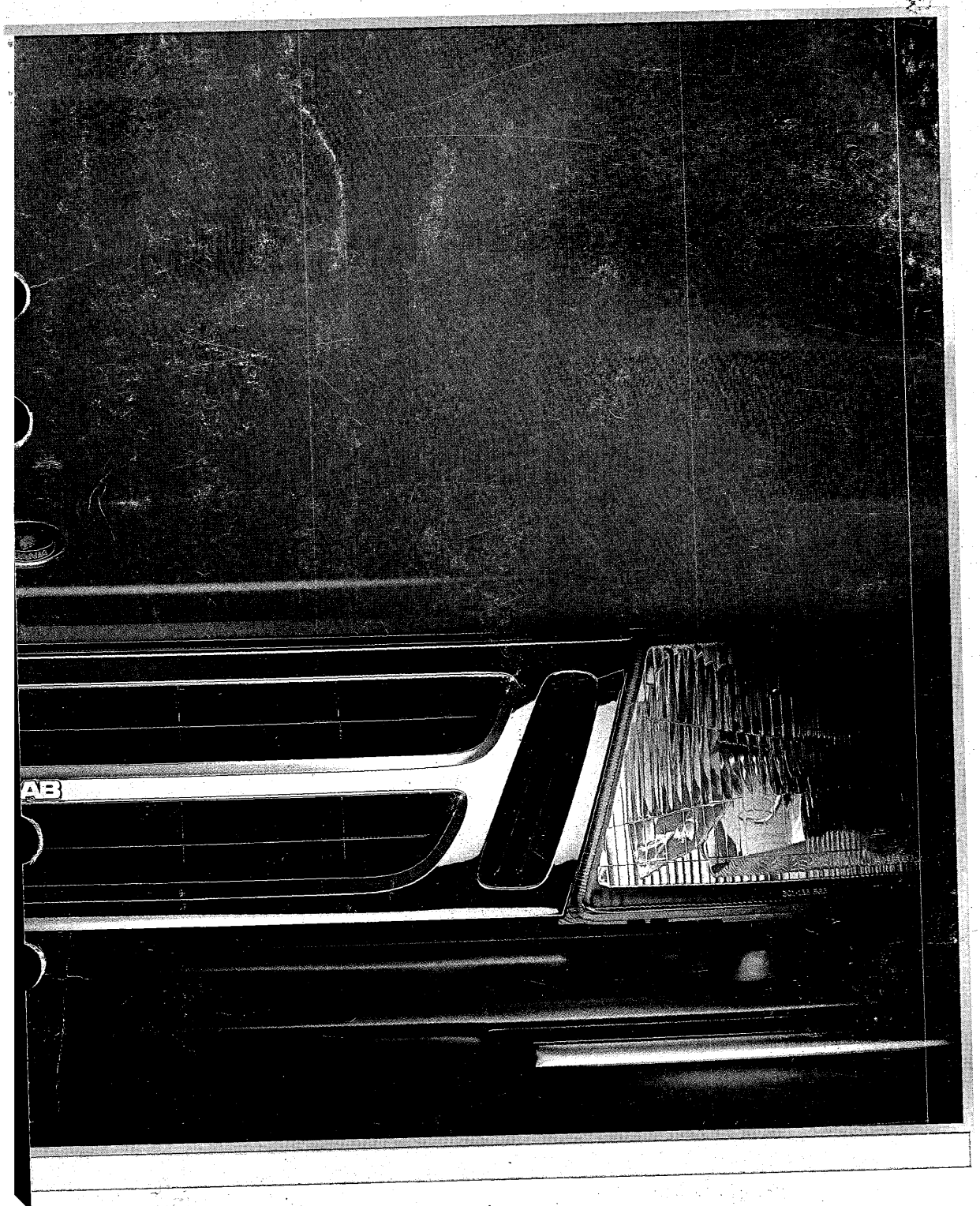
Saab 9000

SERVICE MANUAL



SAAB

Saab 9000

SERVICE MANUAL

0 Technical data

M 1985–92

Units

The basic and derived units used throughout the Service Manual are in accordance with the SI system. (Systéme International d'Unités)

For users not familiar with the SI units, some non-Continental units are given in brackets after the respective SI unit.

The following symbols and abbreviations are used:

SI unit	Equivalent unit and symbol
Millimeter (mm)	inch (in)
Kilograme (kg)	pound (lb)
Newton (N)	pound-force (lbf)
Newtonmeter (Nm)	foot pound (ft lb)
Atmosphere (bar)	pound-force per square inch (lbf/in^2) (Also abbreviated: psi)
Liter (l)	US liquid quart (liq qt) (Also abbreviated: qts)
	US gallon (USgal)
°Celcius (°C)	°Fahrenheit (°F)

Conversion factors

1 in = 25.4 mm	1 mm = 0.039 in
1 lb = 0.45 kg	1 kg = 2.20 lb
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 lbf/in^2
1 US liq qt = 0.83 UKqt	1 l = 1.05 liq qt
	1 USgal = 0.83 UKgal
°F = °C x 9/5 + 32	°C = (°F - 32) x 5/9

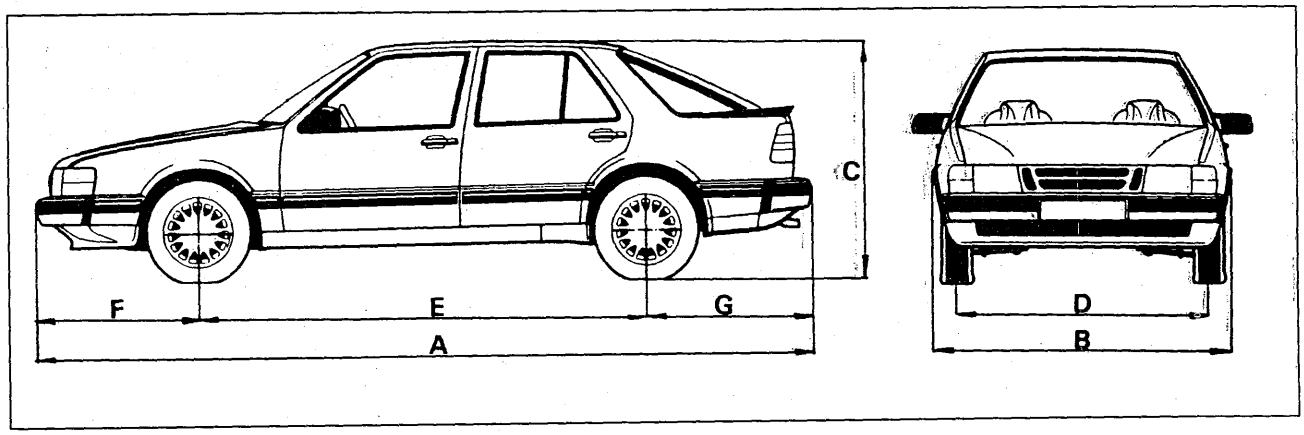
Market codes

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		

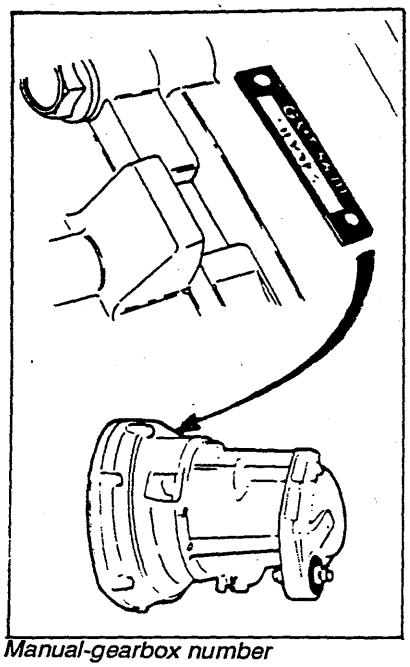
Production: Technical Publications, Saab Automobile AB, Trollhättan, Sweden

General

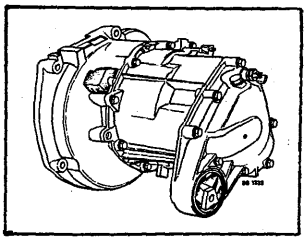


General data

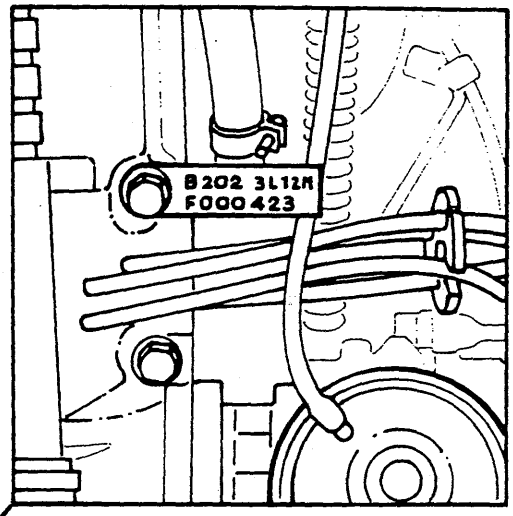
		9000 5-door	9000 CD	9000 CS
A Overall length	mm (in)	4620 (182)	4780 (188)	4761 (186)
B Overall width	mm (in)	1764-1806 (68.8-70.4)	1764-1806 (68.8-70.4)	1778 (69.3)
C Maximum height	mm (in)	1430 (56); M86 onwards: 1420 (55.4)	1420 (55.4)	1420 (55.4)
Ground clearance	mm (in)	150 (5.9); M87 onwards: 155 (6.1)	155 (6.1)	159 (6.2)
D Front track	mm (in)	5 1/2-inch wheels: 1510 (58.9)	5 1/2-inch wheels: 1510 (58.9)	5 1/2-inch wheels: 1510 (58.9)
	mm (in)	6-inch wheels: 1522 (59.4)	6-inch wheels: 1522 (59.4)	6-inch wheels: 1522 (59.4)
	mm (in)	6 1/2-inch wheels: 1534 (59.8)	6 1/2-inch wheels: 1534 (59.8)	6 1/2-inch wheels: 1534 (59.8)
	mm (in)	7-inch wheels: 1538 (60)	7-inch wheels: 1538 (60)	7-inch wheels: 1538 (60)
Rear track	mm (in)	5 1/2-inch wheels: 1480 (57.7)	5 1/2-inch wheels: 1480 (57.7)	5 1/2-inch wheels: 1480 (57.7)
	mm (in)	6-inch wheels: 1492 (58.5)	6-inch wheels: 1492 (58.5)	6-inch wheels: 1492 (58.5)
	mm (in)	6 1/2-inch wheels: 1504 (58.7)	6 1/2-inch wheels: 1504 (58.7)	6 1/2-inch wheels: 1504 (58.7)
	mm (in)	7-inch wheels: 1508 (58.7)	7-inch wheels: 1508 (58.7)	7-inch wheels: 1508 (58.7)
E Wheelbase	mm (in)	2672 (104)	2672 (104)	2672 (104)
F Front overhang	mm (in)	965 (37.6) 1991–: 1012 (39.5)	1012 (39.5)	1026 (40.0)
G Rear overhang	mm (in)	983 (38.3)	1096 (42.7)	1063 (41.5)
Turning-circle radius	m (in)	5,45 (215)	5,45 (215)	5,45 (215)
Kerb weight	kg (lb)	1295-1540 (2830-3390)	1410-1550 (3110-3410)	1410-1560 (3110-3430)
Gross weight	kg (lb)	1780-1960 (3920-4310)	1780-1960 (3920-4310)	1830-1960 (4030-4310)
Max axle load, front	kg (lb)	1000-1060 (2200-2330)	1000-1060 (2200-2330)	1060 (2330)
Max axle load, rear	kg (lb)	920-980 (2030-2160)	920-980 (2030-2160)	980 (2160)
Max roof-rack load	kg (lb)	100 (220)	100 (220)	100 (220)
Max trailer weight	kg (lb)	1600 (3500)	1600 (3500)	1800 (3970)



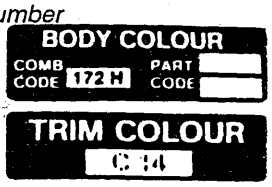
Manual-gearbox number



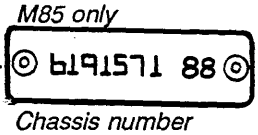
Automatic-transmission number



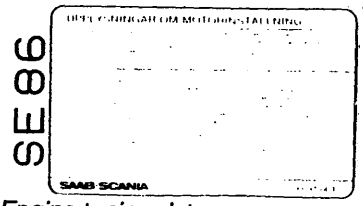
Engine number



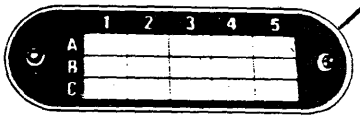
Body trim colour-code plate
M85 only



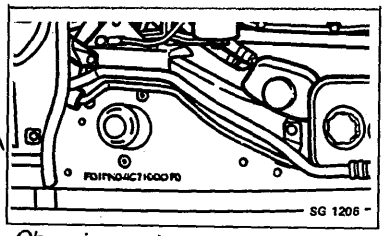
Chassis number



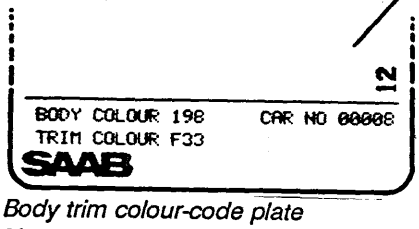
Engine-tuning data



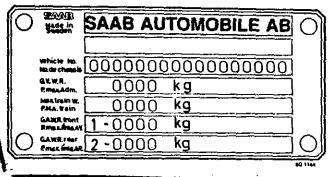
Modification code plate

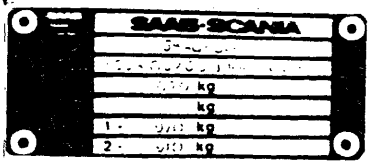


Chassis-number 1992–

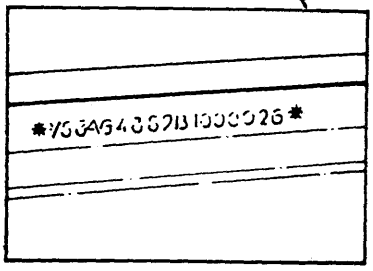


Body trim colour-code plate
M91 onwards

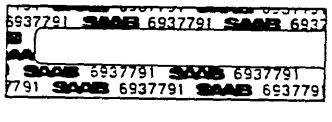




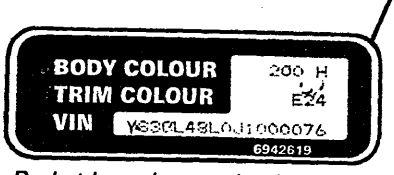
Chassis-number plate



Chassis number punched in car body, to the left of RH rear light, behind panel in luggage compartment (pre-M89); or on crossmember inside spare-wheel well (M89-M91)



Production label



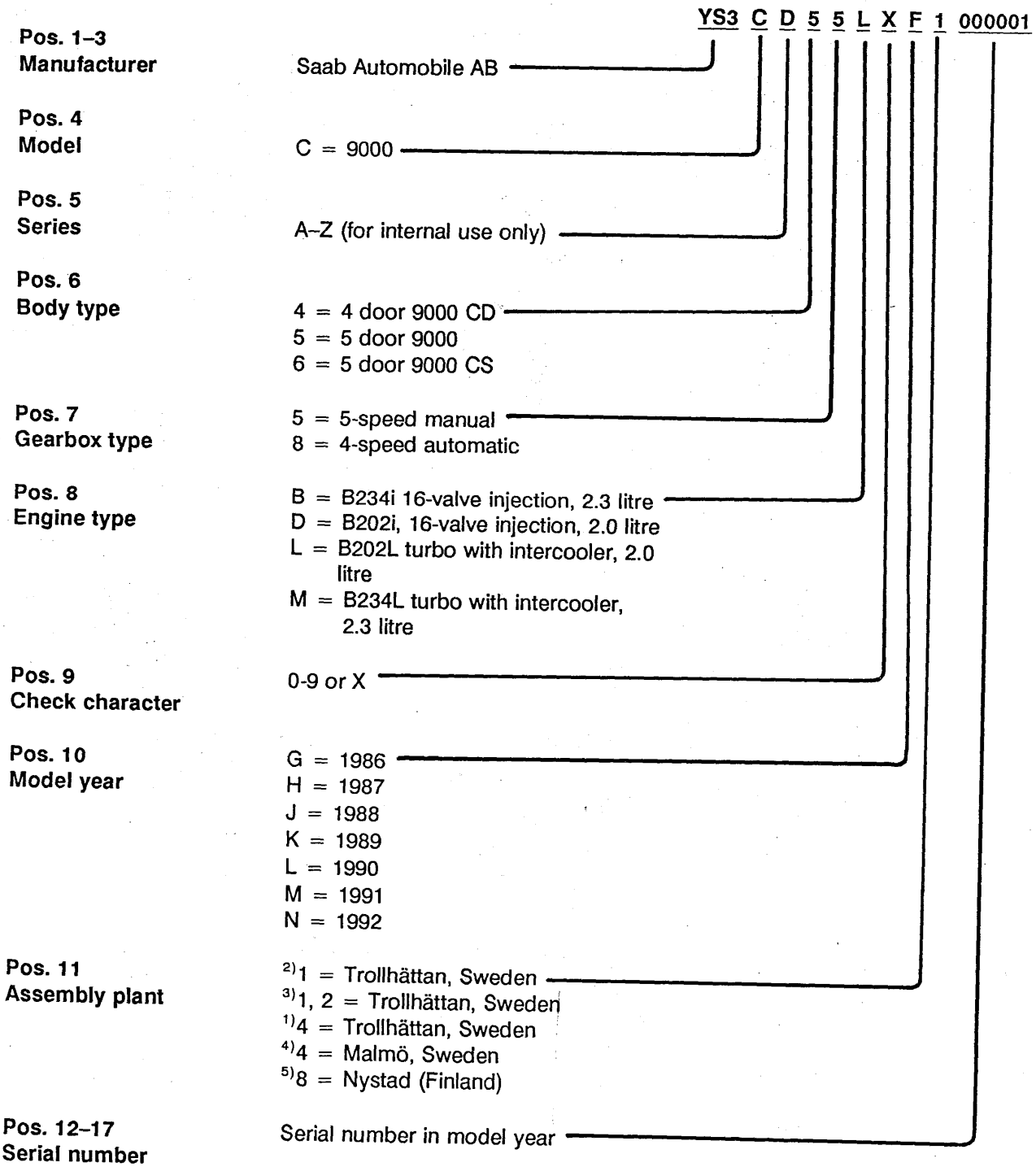
Body trim colour-code plate
Pre-M91

Spare parts label

Chassis and engine numbers

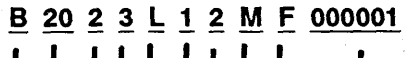
The locations of the chassis and engine-number plates, etc. are shown on the facing page. For positive identification of a car or engine, always quote these numbers, together with the odometer reading, e.g. when claims are being submitted.
If a replacement engine has been fitted, the number of the old engine must be stamped in the place provided. This is essential to avoid problems if the car is used for travel abroad at a future date.

Vehicle Identification Number = VIN (Chassis number)



1)M85–86
2)M86 onwards
3)M88 onwards
4) M89 onwards
5) M85–90 (incl.)

Engine number pre-M90



Pos. 1 — **Engine type**
B = Petrol (gasoline) engine

Pos. 2 -3 — **Swept volume**
20 = 2 dm^3 (2.0 litres)

Pos. 4 — **Cylinder head**
2 = Cylinder head with twin camshafts

Pos. 5 — **Model series**
3 = Saab 9000

Pos. 6 — **Version**
I = Injection
L = Turbo with intercooler

Pos. 7 — **Variant**
0 = Without knock detector
1 = With knock detector
2 = With Saab DI
3 = Alternative turbo unit and special inlet valves
4 = Alternative turbo unit
5 = Fitted with cold-start valve

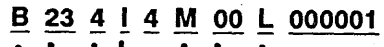
Pos. 8 — **Exhaust emission control spec.**
0 = To no specific market specification
1 = To minimum European specification
2 = To minimum Swedish specification
3 = To minimum US specification
4 = To minimum Australian specification
5 = To minimum ME specification

Pos. 9 — **Gearbox type**
A = Automatic transmission
M = Manual gearbox

Pos. 10 — **Model year**
F = 1985
G = 1986
H = 1987
J = 1988
K = 1989

Pos. 11-16 — **Serial number**

Engine number M90 onwards



Pos. 1 **Engine type**
B = Petrol (gasoline) engine

Pos. 2 -3 **Swept volume**
20 = 1.985 dm^3 (litres)
23 = 2.290 dm^3 (litres)

Pos. 4 **Cylinder head**
2 = Cylinder head with twin camshafts
4 = Cylinder head with twin camshafts and twin balancer shafts

Pos. 5 **Version**
I = Fuel-injected
S = Fuel-injected and turbocharged
L = Fuel-injected, turbocharged and fitted with intercooler

Pos. 6 **Model series**
2 = Saab 9000 with exhaust emission control to ECE-R15/04
4 = Saab 9000 with exhaust emission control meeting Swedish A12 (–1991) or A13 (1992–) regulation and US federal register FTP-75 (–1991) or CRF 40/86 (1992–)
4 = Saab 9000 with exhaust emission control meeting "State of California Administration Code Title 13" or Swedish A13 regulation and US federal register CRF 40/86

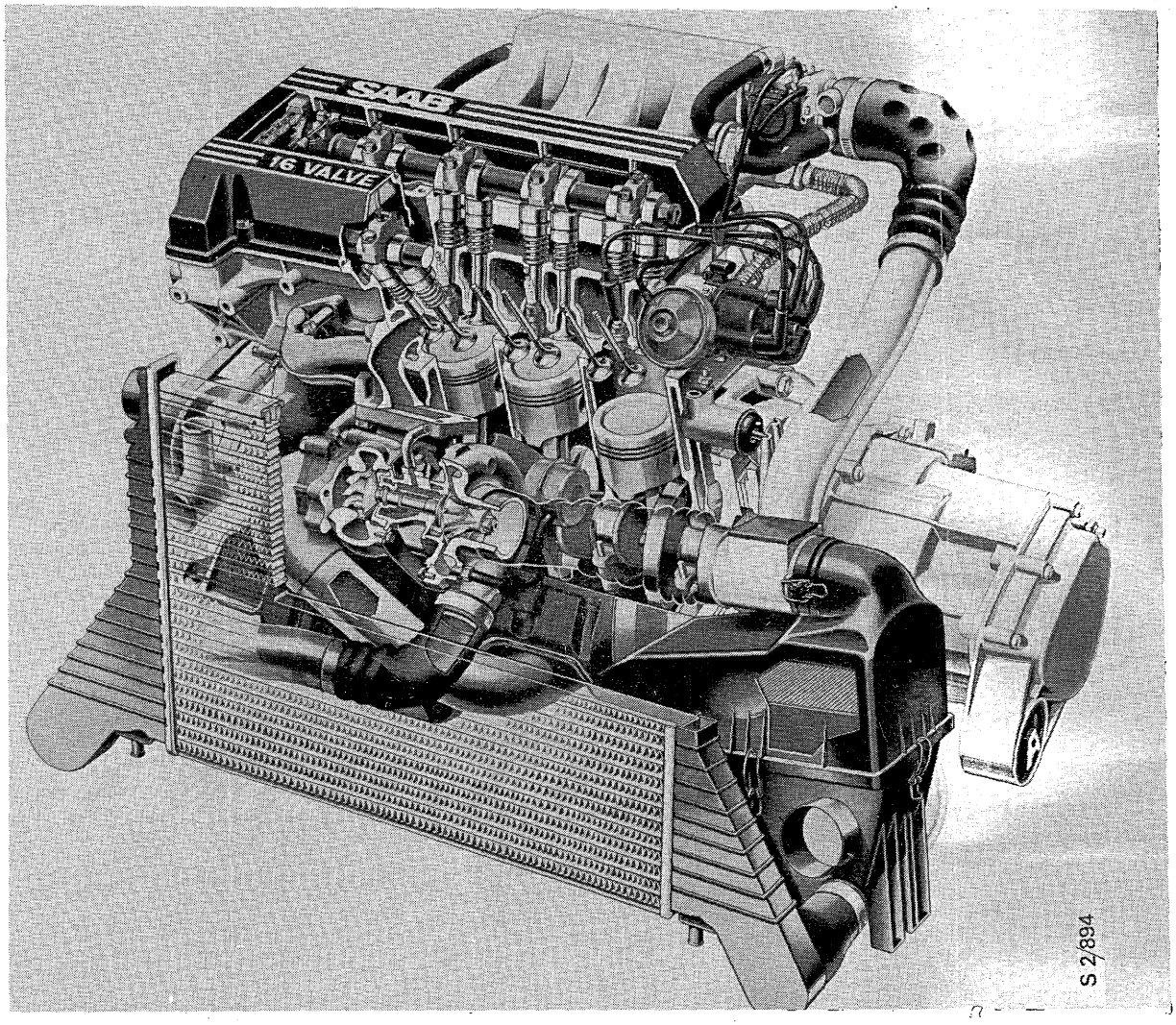
Pos. 7 **Gearbox type**
A = Automatic transmission
M = Manual gearbox

Pos. 8 -9 **Variant**
00 = Basic (no variant)
01 = Engine modified to meet ELCD requirements
02 = Specially equipped for improved cold starting
05 = Special inlet valves
06 = Special inlet valves and modified to meet ELCD requirements
07 = Equipped with T25 turbo
08 = Equipped with ETS
09 = Equipped with power optimization
10 = Equipped with split inlet manifold
11 = Equipped with split inlet manifold and ETS
12 = Modified for cold climates
13 = Modified for cold climates and equipped with ETS
14 = Equipped with power optimization and ETS
15 = Equipped with acid-resistant fuel system

Pos. 10 **Model year**
L = M90
M = M91
N = 1992

Pos. 11-16 **Serial number**

Engine



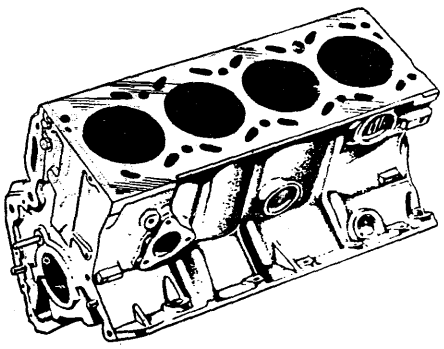
General data

Engine type		Transverse 4-cylinder, 4-stroke, 16-valve engine with twin overhead camshafts	Transverse 4-cylinder, 4-stroke, 16-valve engine with twin overhead camshafts and twin balancer shafts
Cylinder bore	mm (in)	90 (3.54)	90 (3.54)
Stroke	mm (in)	78 (3.07)	90 (3.54)
Swept volume	cm^3 (in^3)	1985 (121)	2290 (140)
Firing order		1-3-4-2	1-3-4-2
Approximate weight	kg (lb)	150 (330)	160 (350)

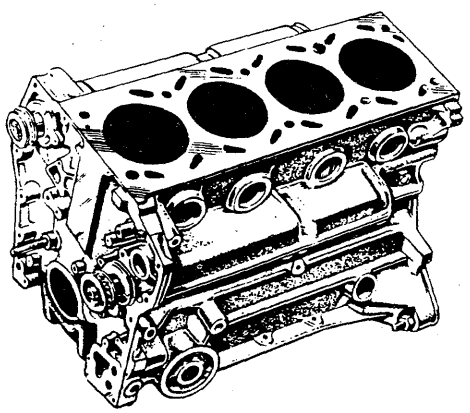
Performance, compression ratio, fuel octane number, etc.

Engine variant	Model year	Octane requirement, RON (AKI)*	Suitable for unleaded fuel	Compression ratio	DIN rating, kW (bhp) at rpm	Torque, Nm (lbf ft) at rpm
B202i	1986-	91 min. Recommended 98	Yes	10.1	96 (130)/5500	173 (128)/3000
	1989-				99 (135)/6000	173 (128)/3750
B202i cat	1986-	min 91 (87) min. Recommended 95 (91)	Yes	10.1	92 (125)/5500	170 (126)/3000
	1989-				96 (130)/6000	173 (128)/3750
B202 Turbo	1985-	91 min Recommended: 98	Yes	9.0	129 (175)/5300	270 (200)/3000
B202 Turbo cat	1986-	91 (87) min Recommended: 95 (91)	Yes	9.0	118 (160)/5500	255 (188)/3000
DI	1989-				121 (165)/5500	265 (196)/3000
B234i	1990-	91 (87) min Recommended: 95 (91)	Yes	10.1	110 (150)/5500	212 (157)/3800
B234 Turbo Manual	1991-	91 (87) min Recommended: 95 (91)	Yes	8.5	147 (200)/ 5000	330 (242)/2000
Automatic					147 (200)/ 5000	300 (221)/2000

*) The specified octane numbers are minimum values. The figures may differ from those given in the Owner's Manual, as the latter apply to grades available at the pumps in the year in question.



B202



B234

Block

Cylinder bores (B202)

Standard (A)	mm (in)	90,000-90,010 (3.5433-3.5437)
Standard (B)	mm (in)	90,010-90,020 (3.5437-3.5441)
First oversize	mm (in)	90,500 (3.5630)
Second oversize	mm (in)	91,000 (3.5827)

Cylinder bores (B234)

Standard (A)	mm (in)	90,000-90,012 (3.5433-3.5437)
Standard (B)	mm (in)	90,003-90,020 (3.5437-3.5441)
First oversize	mm (in)	90,500-90,512 (3.5630-3.5635)
Second oversize	mm (in)	91,000-91,012 (3.5827-3.5831)

Cylinder head

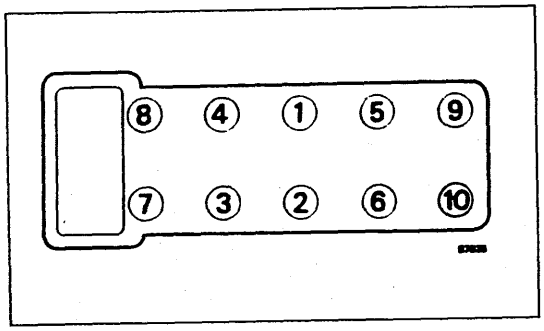
Height of new head	mm (in)	140,5 ± 0,1 (5.53 ± 0.004)
Minimum after regrinding	mm (in)	140,1 ± 0,1 (5.52 ± 0.004)

Tightening torques M85 onwards

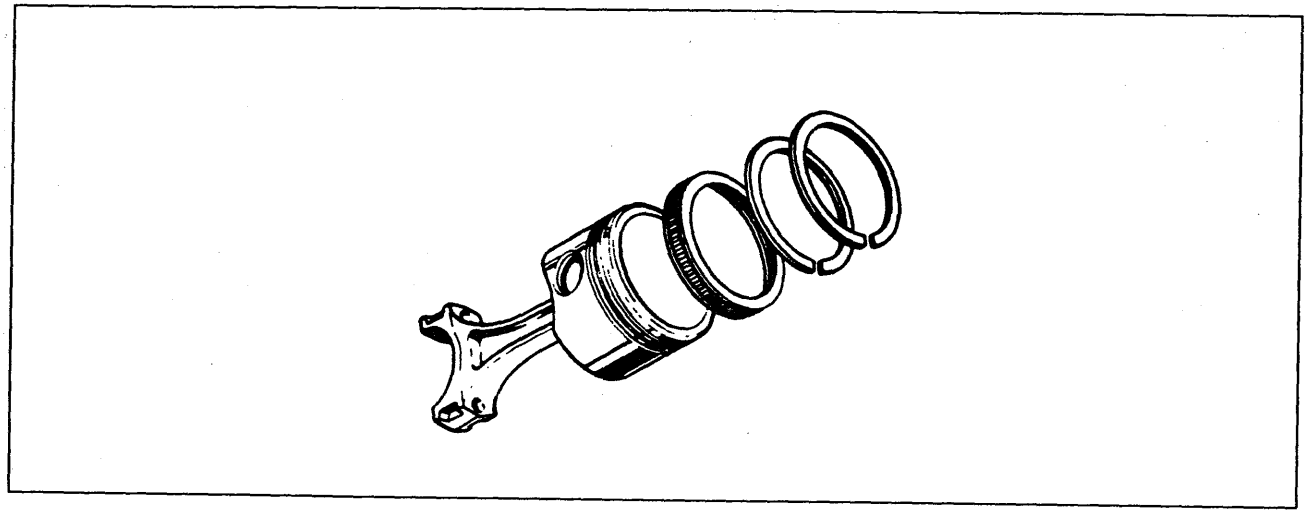
The specified torques apply to lubricated bolts and washers and when a new head gasket (75 85 045) is being fitted

Stage I	Nm (lbf ft)	60 (44)
Stage II	Nm (lbf ft)	80 (59)
Stage III		Tighten a further 1/4-turn (90°)

Tightening sequence

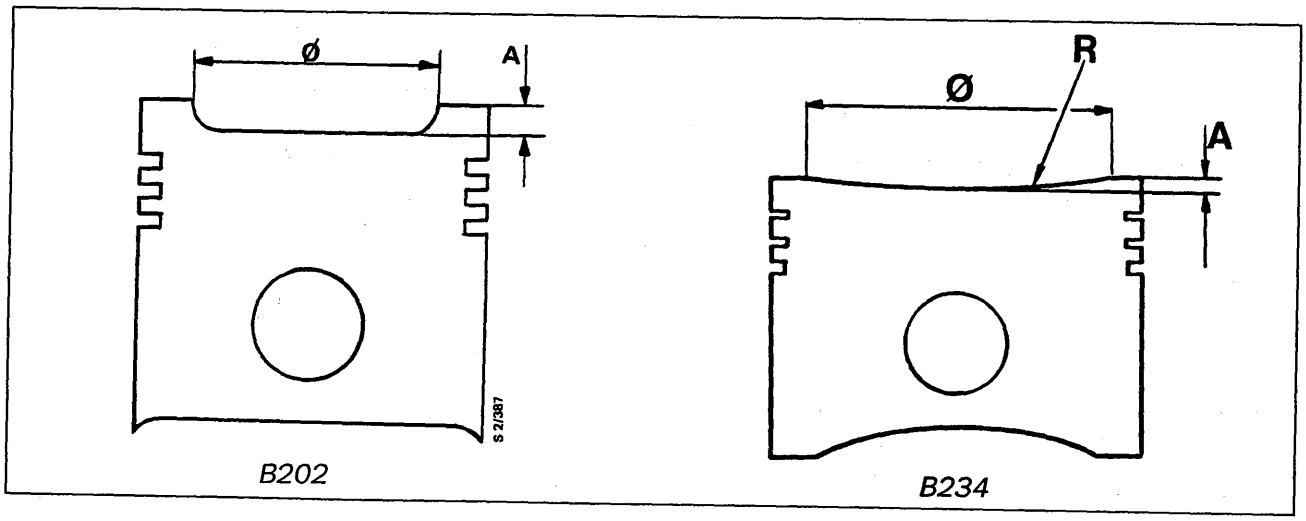


Pistons



		B202	B234
Piston speed at 5000 rpm	m/s	13	15

Piston dimensions



Different pistons are fitted depending on the compression ratio of the engine

Engine	Model year		Ø	A	R
B202 Turbo	1985	mm (in)	64 (2.52)	4,7 (0.185)	
B202 Turbo	1986-	mm (in)	64 (2.52)	3,85 (0.152)	
B202i	1987-	mm (in)	64 (2.52)	1,0 (0.040)	
B234i	1990-	mm (in)	75 (2.95)	3,05 (0.120)	257 (10.1)
B234 Turbo	1991-	mm (in)	80 (3.15)	7,95 (0.313)	108 (4.25)

Note

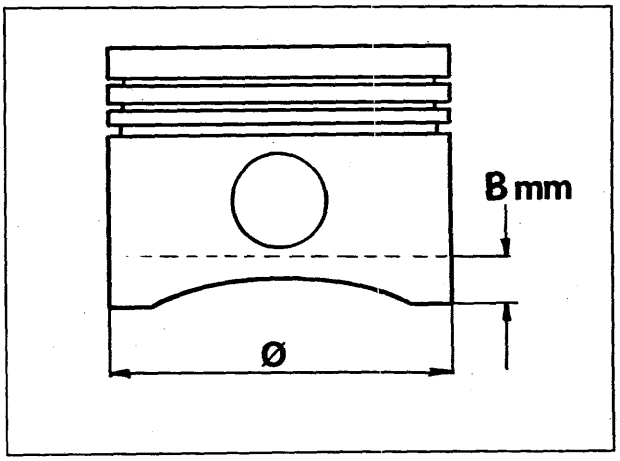
Different makes of piston must not be fitted in the same engine.

Piston diameter

This is measured at right angles to the piston boss, at a distance, B, from the bottom of the skirt.

B202: B = 16 mm

B234: B = 9 mm



Classification of pistons and cylinder bores

The piston classification code is stamped on the piston crown. The service codes are:

AB

B

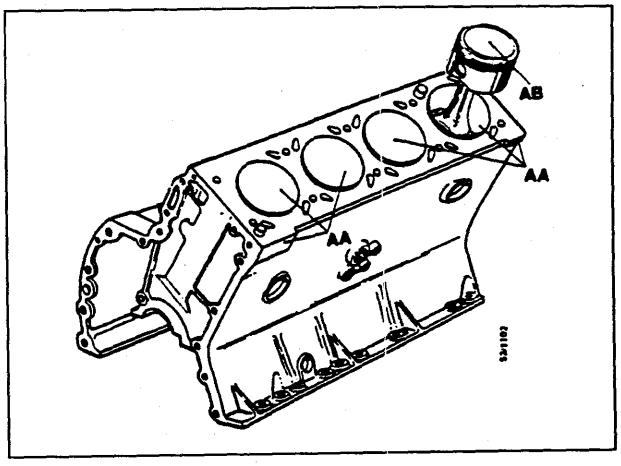
C

First oversize (0.5 mm)

Second oversize (1.0 mm)

The cylinder classification code for each cylinder is stamped on the block.

Cylinders are either class A or class B, both of which may occur in the same block.



Piston sizes

B202i

Standard A (not carried as spare part)	mm (in)	89,971-89,980 (3.5089-3.5092)
Standard AB	mm (in)	89,980-89,989 (3.5092-3.5096)
Standard B	mm (in)	89,989-90,000 (3.5096-3.5100)
Standard C	mm (in)	90,000-90,008 (3.5100-3.5103)
First oversize (0.5 mm)	mm (in)	90,470-90,485 (3.5283-3.5289)
Second oversize (1.0 mm)	mm (in)	90,970-90,985 (3.5478-3.5484)
Nominal piston clearance	mm (in)	0,01-0,039 (0.0004-0.0015)

B202 Turbo

Standard A (not carried as spare part)	mm (in)	89,967-89,977 (3.5087-3.5091)
Standard AB	mm (in)	89,977-89,985 (3.5091-3.5094)
Standard B	mm (in)	89,985-89,993 (3.5094-3.5097)
Standard C	mm (in)	89,993-90,009 (3.5097-3.5103)
First oversize (0.5 mm)	mm (in)	90,470-90,485 (3.5283-3.5289)
Second oversize (1.0 mm)	mm (in)	90,970-90,985 (3.5478-3.5484)
Nominal piston clearance	mm (in)	0,015-0,043 (0.0006-0.0017)

B234

Standard A (not carried as spare part)	mm (in)	89,971-89,980 (3.5089-3.5092)
Standard AB	mm (in)	89.980-89,989 (3.5092-3.5096)
Standard B (B234i)	mm (in)	89,989-90,000 (3.5096-3.5100)
Standard B (B234 Turbo)	mm (in)	89,989-89,997 (3.5096-3.5099)
Standard C (B234i)	mm (in)	90,000-90,013 (3.5100-3.5105)
Standard C (B234 Turbo)	mm (in)	89,997-90,013 (3.5099-3.5105)
First oversize (0.5 mm)	mm (in)	90,472-90,488 (3.5284-3.5290)
Second oversize (1.0 mm)	mm (in)	90,972-90,988 (3.5479-3.5485)
Nominal piston clearance	mm (in)	0,006-0,041 (0.0002-0.0016)

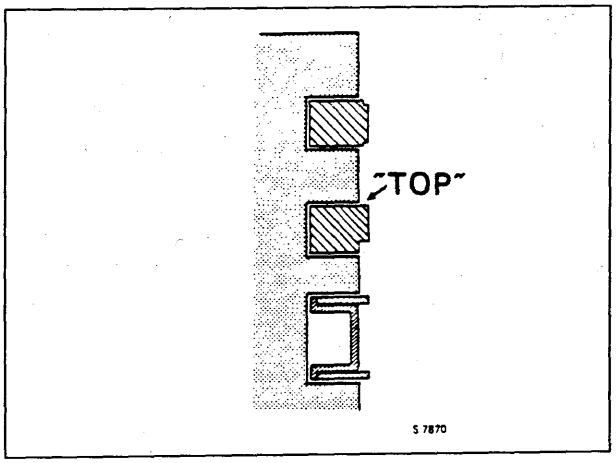
Classification piston/cylinder		**Clearances**	
		B202	**B234**
A/A	1/1000 mm	30-50	20-41
AB/A	1/1000 mm	22-40	11-32
AB/B	1/1000 mm	32-50	14-40
B/A	1/1000 mm	14-32	-
B/B	1/1000 mm	24-42	6-31

Piston rings

B202		Top compression ring	Second compression ring	Oil-scraper ring
Width (thickness)	mm (in)	1,728-1,74 (0.0674-0.0679)	1,980-1,996 (0.0772-0.0779)	2,63-2,73* (0.1035-0.1075)
Side clearance in groove	mm (in)	0,050-0,082 (0.0019-0.0032)	0,034-0,070 (0.0013-0.0027)	
Working gap in new cylinder	mm (in)	0,35-0,48 (0.0136-0.0187)	0,25-0,38 (0.0098-0.0148)	0,38-1,40*** (0.0149-0.0551)

* Segment width (thickness): 0.58-0.64 mm (0.023-0.025 in)

*** Applies to segment



B234		Top compression ring	Second compression ring	Oil-scraper ring
Width (thickness)	mm (in)	1,728-1,740 (0.0680-0.0685)	1,980-1,996 (0.0780-0.0786)	2,934-3,052** (0.1155-0.1206)
Side clearance in groove	mm (in)	0,050-0,082 (0.0020-0.0033)	0,034-0,070 (0.0014-0.0028)	
Working gap in new cylinder	mm (in)	0,30-0,50 (0.012-0.020)	0,30-0,45 (0.0118-0.0177)	0,38-1,40*** (0.0149-0.0551)

** Segment width (thickness): 0.51 mm (0.020 in)

*** Applies to segment

Gudgeon pins

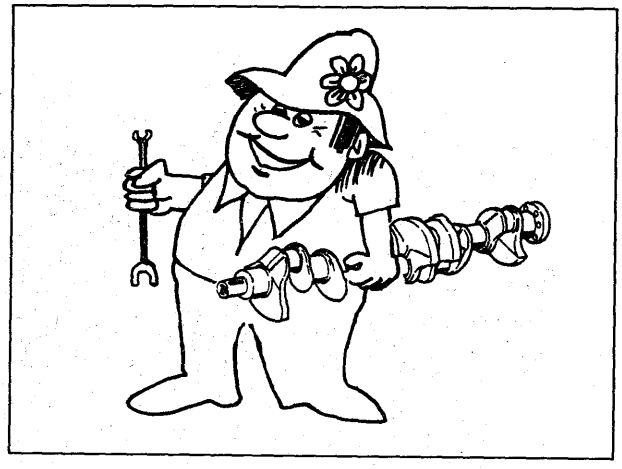
B202		
Diameter	mm (in)	23,996-24,000 (0.9447-0.9449)
Fit	mm (in)	-0,001 - +0,008 (-0.00004 - +0.00031)

B234		
Diameter	mm (in)	23,996-24,000 (0.9447-0.9449)
Fit, injection engines	mm (in)	0,005-0,014 (0.0002-0.0006) (Sliding fit under gentle thumb pressure)
Fit, turbo engines	mm (in)	0,002-0,011 (0.0001-0.0004) (Sliding fit under gentle thumb pressure)

Connecting rods

Diameter of big end	mm (in)	56,000-56,019 (2.2047-2.2055)
Diameter of small-end bush (fitted)	mm (in)	24,005-24,010 (0.9451-0.9453)
Maximum permissible weight variation per set	g (oz)	B202: 9 (0.32). B234: 6 (0.22)

Crankshaft



B202

Alignment-max. deflection (variation in straightness)	mm (in)	0.10 (0.004)
End float	mm (in)	0.06-0.31 (0.002-0.012)
Maximum journal out-of-round (ovality)	mm (in)	0,005 (0.0002)
Maximum taper of journals	mm (in)	0,004 (0.0002)
Radius of main journal fillet	mm (in)	1,65-1,85 (0.064-0.072)
Main bearing clearance	mm (in)	0,020-0,062 (0.0008-0.00244)

B234

Alignment-max. deflection (variation in straightness)	mm (in)	0,10 (0.004)
End float	mm (in)	0,06-0,31 (0.002-0.012)
Maximum journal out-of-round (ovality)	mm (in)	0,005 (0.0002)
Maximum taper of journals	mm (in)	0,004 (0.0002)
Radius of main journal fillet	mm (in)	1,65-1,85 (0.065-0.073)
Main bearing clearance	mm (in)	0,020-0,062 (0.0008-0.00244)
Length	mm (in)	543 (21.4)

Colour markings of main-bearing and big-end bearing shells

	thin	thick
Standard	Red	Blue
First undersize	Yellow	Green
Second undersize	White	Brown

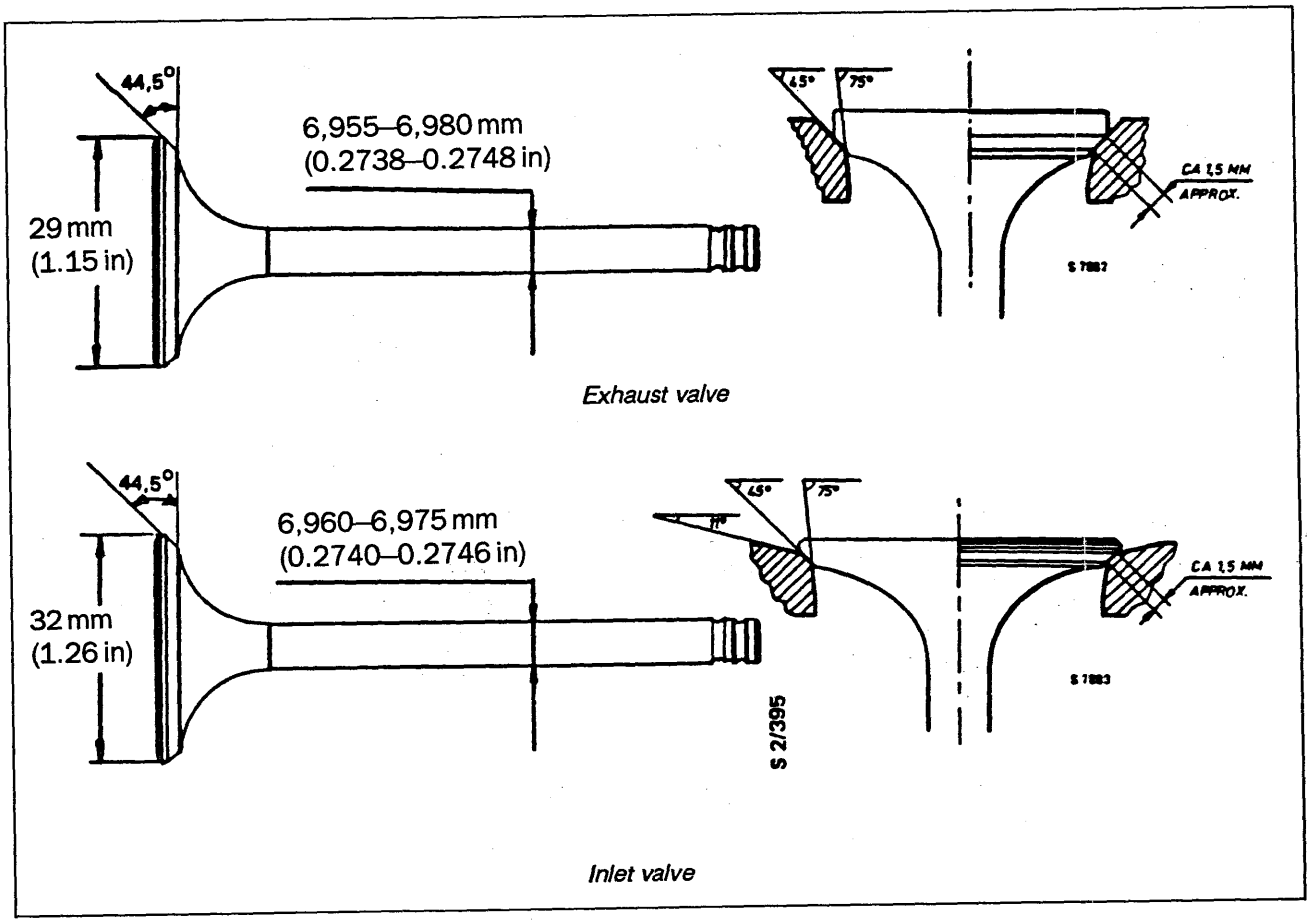
Crankpin diameter

Standard	mm (in)	51,981-52,000 (2.0465-2.0472)
First undersize	mm (in)	51,731-51,750 (2.0366-2.0374)
Second undersize	mm (in)	51,481-51,500 (2.0268-2.0276)
Third undersize	mm (in)	51,237-51,250 (2.0172-2.0177)
Fourth undersize	mm (in)	50,987-51,000 (2.0074-2.0079)
Big-end bearing clearance	mm (in)	0,026-0,062 (0.0010-0.0024)

Main-journal diameter

Standard	mm (in)	57,981-58,000 (2.2827-2.2835)
First undersize	mm (in)	57,731-57,750 (2.2729-2.2736)
Second undersize	mm (in)	57,481-57,500 (2.2630-2.2638)
Third undersize	mm (in)	57,237-57,250 (2.2534-2.2539)
Fourth undersize	mm (in)	56,987-57,000 (2.2436-2.2441)

Valve gear

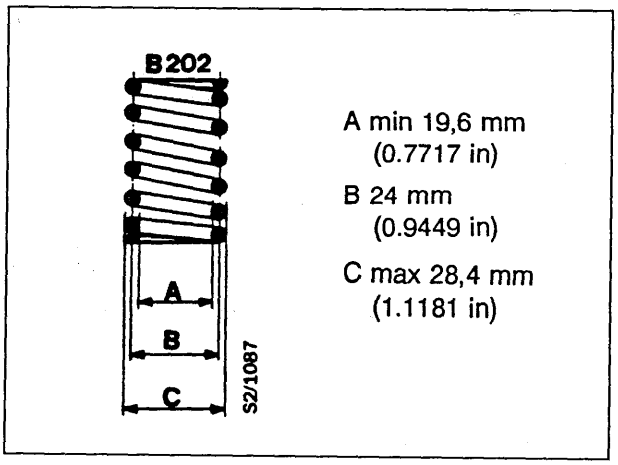


CAUTION

The exhaust valves are stellited and should therefore not be machined. Grinding using valve- grinding (lapping) paste is the only recommended method.

Valve guides

Length, B202	mm (in)	49,0 (1.93)
Length, B234	mm (in)	45,0 (1.77)
Outside diameter	mm (in)	12,039-12,050 (0.4740-0.4744)
Bore for valve guides in cylinder head	mm (in)	12,000-12,018 (0.4724-0.4731)
Maximum clearance between valve stem and valve guide	mm (in)	0.5 (0.02) Measured on valve head raised 3 mm (0.12 in) above seat.



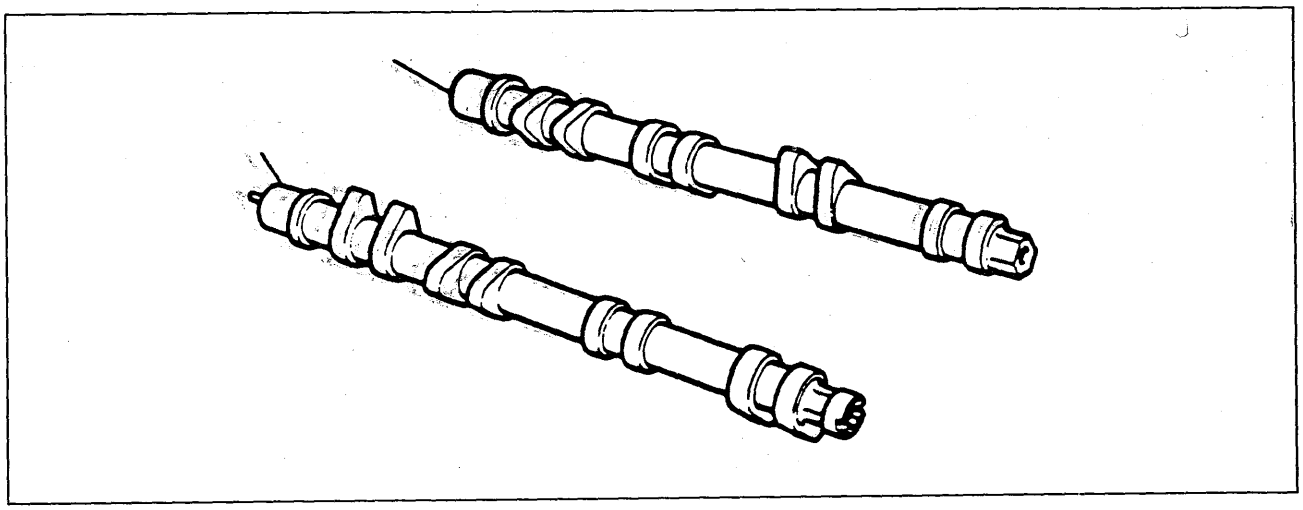
Valve springs

Length fitted	mm (in)	37,0 (1.46)
Free length	mm (in)	45 ± 1,5 (1.77 ± 0.05)
Length when subjected to compressive force of 595-645 N (131-141 lbf) B234 Turbo: 620-645 N (458-477)	mm (in)	28,4 (1.12)

Cam followers

Diameter	mm (in)	32,959-32,975 (1.2976-1.2982)
Height	mm (in)	26,0 (1.024)
Bore for cam followers in cylinder head (camshaft bearing assembly)	mm (in)	33,000-33,016 (1.2992-1.2998)

Camshafts



Number of bearings		5
Bearing diameter	mm (in)	28,922-28,935 (1.1387-1.1392)
End float	mm (in)	0,14-0,35 (0.005-0.014)

Cam lift at zero valve clearance

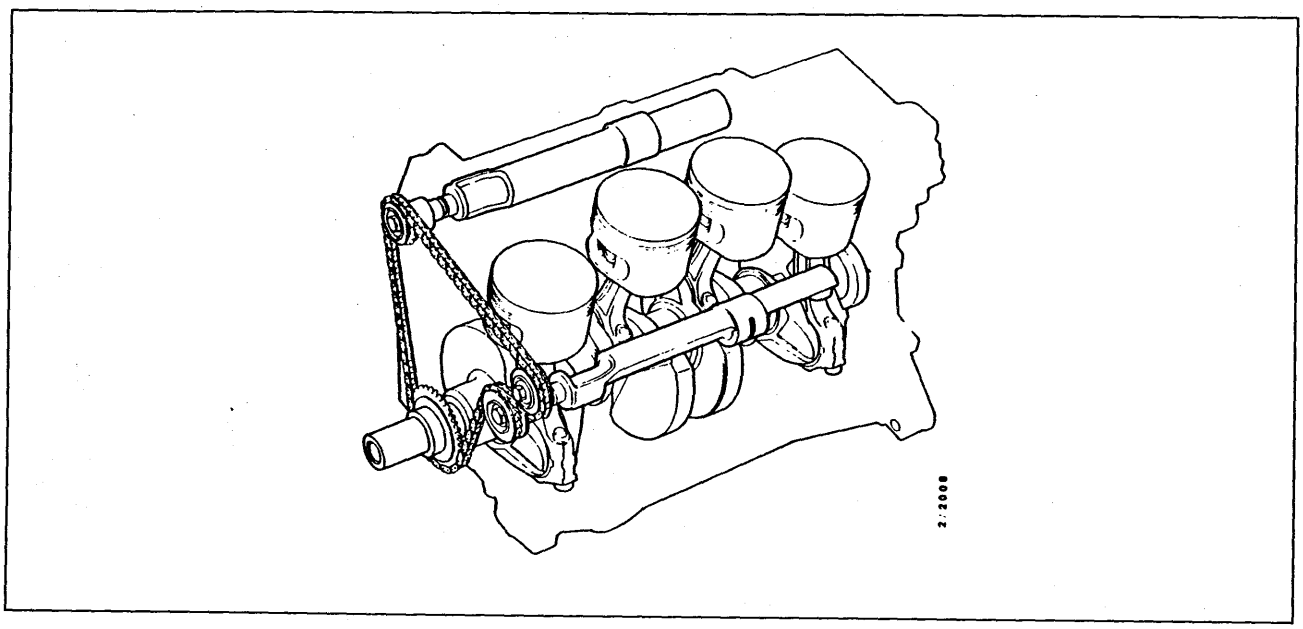
Engine variant	Model year		Inlet valves	Exhaust valves
B202 Turbo	1985	mm (in)	8,65/6,65	8,65 (0.3406)
B202 Turbo cat	-1986	mm (in)	(0.3406/0.2618)	8,65 (0.3406)
B202 Turbo, B202i	1986-	mm (in)	8,65 (0.3406)	8,65 (0.3406)
B202 Turbo cat	1987-	mm (in)	8,65 (0.3406)	8,65 (0.3406)
B234i	1990-	mm (in)	8,65 (0.3406)	8,65 (0.3406)
B234 Turbo	1991-	mm (in)	8,65 (0.3406)	8,65 (0.3406)

Valve timing

(At design clearance of 0.05 mm/0.0002 in for inlet valves and 0.15 mm/0.006 in for exhaust valves)

		Inlet valves		Exhaust valves	
		Open	Close	Open	Close
B202 Turbo 1985	Degrees	16 BTDC	56 ABDC	56 BBDC	10 ATDC
B202 Turbo 1986-	Degrees	16 BTDC	56 ABDC	61 BBDC	13 ATDC
B202i 1986-	Degrees	16 BTDC	44 ABDC	61 BBDC	13 ATDC
B234i 1990-	Degrees	13 BTDC	53 ABDC	50 BBDC	16 ATDC
B234 Turbo 1991-	Degrees	13 BTDC	53 ABDC	50 BBDC	16 ATDC

Balance shafts



Length	mm (in)	295,7 ± 0,5 (11.642 ± 0.020)
Diameter of balance-shaft journal (larger, outer)	mm (in)	39,9 ± 0,008 (1.571 ± 0.0003)
Diameter of balance-shaft bearing (larger, outer)	mm (in)	39,988-40,043 (1.574-1.577)
Bearing clearance (larger, outer)	mm (in)	0,08-0,151 (0.003-0.006)
Maximum permissible bearing clearance when bedded in	mm (in)	0,18 (0.007)
Diameter of balance-shaft journal (smaller, inner)	mm (in)	19,947-19,960 (0.785-0.786)
Diameter of balance-shaft bearing (smaller, inner)	mm (in)	20,000-20,021 (0.787-0.788)
Bearing clearance (smaller, inner)	mm (in)	0,040-0,074 (0.0016-0.0029)

Tightening torques

B202	1985-	1985-			Bolt dimension
	Nm	lbf ft	Nm	lbf ft	
Main bearings	110	81			M12
Big-end bearings	55	41			M10x1
Camshaft bearing caps	15	11			M8
Camshaft cover	15	11			M8
Crankshaft pulley	190	140			M16
Crankshaft pulley			175 (M91-)	129 (M91-)	M16x1.5
Flywheel (17-mm head)	60	44			M10
Flywheel (19-mm head)	85	63			M10
Oilpump	8	5.9			M6
Engine oil drain plug	18-29	13-21			M13
Timing-chain tensioner	63	47			M22x1.5
Camshaft sprocket	63	47			M10
Inlet manifold	18	13.5	22 (M89-)	16 (M89-)	M8
Thermostat housing	18	13.5	22 (M89-)	16 (M89-)	M8
Throttle housing	18	13.5	22 (M89-)	16 (M89-)	M8
Exhaust manifold	25	19	25[1]/18[2]	19[1]/13[2]	M8
Timing cover	20	15	25 (M89-)	18 (M89-)	M8
Distributor	18	13			M8
Knock detector	20 ± 5	15 ± 3.7			
Knock detector (DI)	13	9.6			
Knock detector (engine number -G122318)	14	10.4			

B234	Torque, Nm	Torque, lbf ft	Bolt dimension
Main bearings	110 ± 17	81 ± 12	M12
Big-end bearings	48 ± 7	35 ± 5	M9x1
Camshaft bearing caps	15	11	M8
Camshaft cover	15	11	M8
Crankshaft pulley	175	129	M16x1.5
Flywheel (19-mm head)	85	63	M10
Oil pump	8	6	M6
Engine oil drain plug	18-29	13-21	M13
Timing-chain tensioner	63	47	M22x1.5
Camshaft sprocket	63	47	M10
Inlet manifold	22	16	M8
Thermostat housing	22	16	M8
Throttle housing	22	16	M8
Exhaust manifold	18 (i) 25 (T)	13 (i) 19 (T)	M8
Timing cover	25	19	M8
Knock detector	13	9.6	
Balance-shaft sprockets	63	47	M10
Balance-shaft idler-wheel sprocket	22	17	M8
Plug for piston-cooling port	23	17	M10x1
Plug for engine-heater tapping	20	15	M38x1,5

[1] B202 Turbo

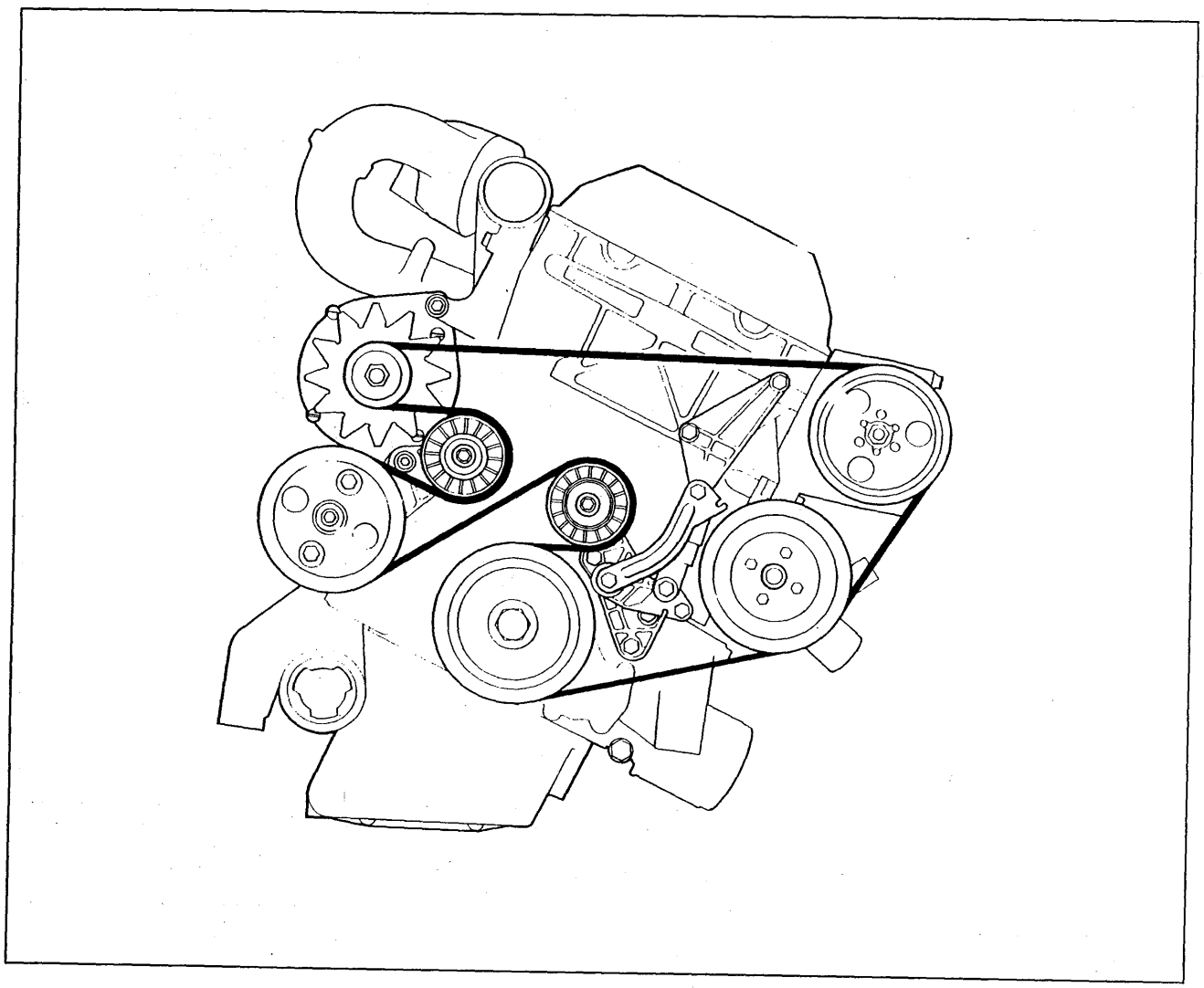
[2] B202i

Tightening torques for other bolts

Bolt dimension	Torque	
	Nm	lbf ft
M5	5	3.7
M6	10	7.4
M8	20	15
M10	40	30

For other items, see STD HB 98

Drive-belt tension (B234)



Drive belt (B234)

Minimum value on checking	N (lbf)	170 (38)

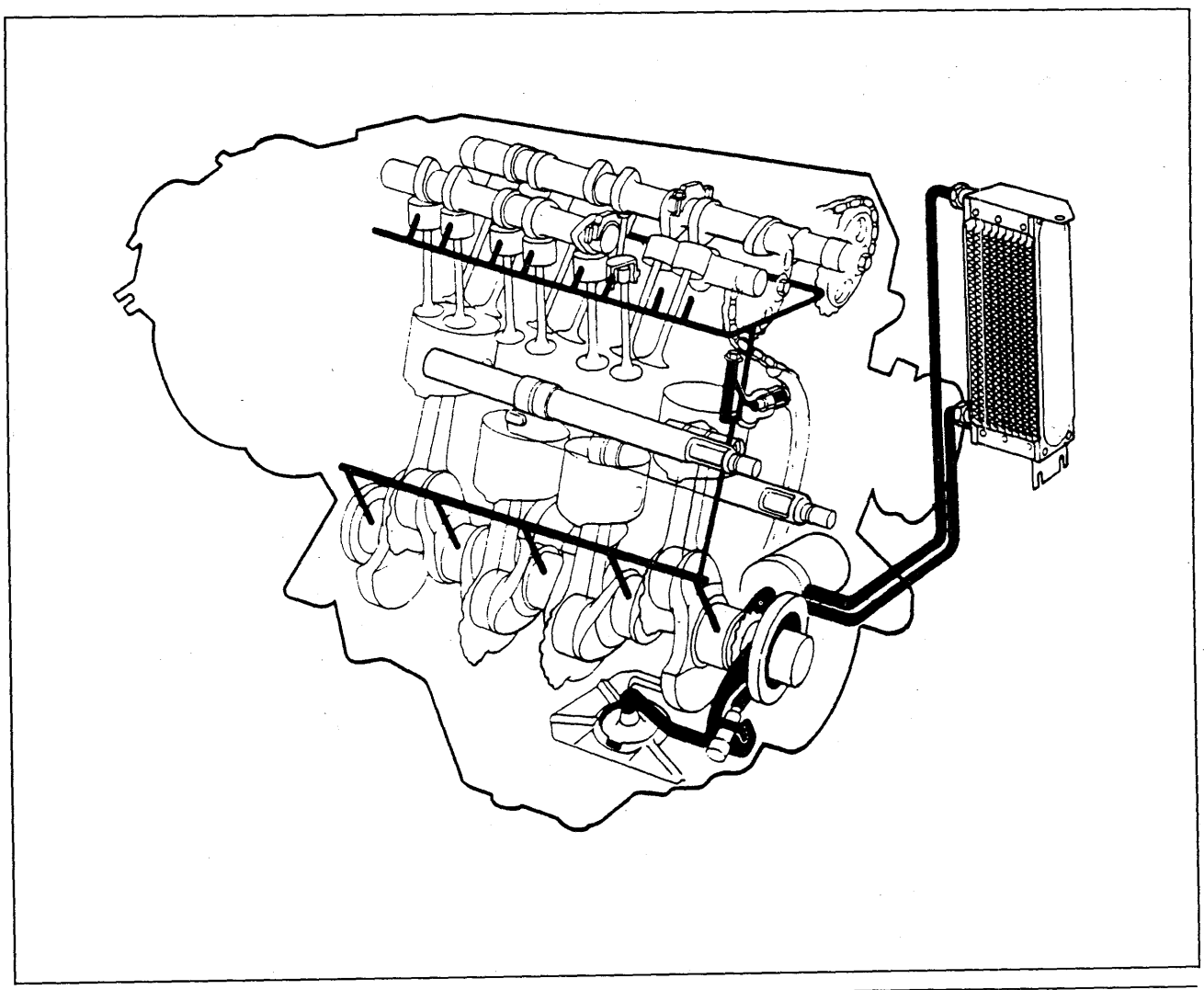
Drive belt for alternator and steering servo pump (B202)

Minimum tension	N (lbf)	355 (80)
Value for retightening	N (lbf)	535 ± 45 (120 ± 10)
New belt	N (lbf)	800 ± 45 (180 ± 10)

Drive belt for AC Compressor (B202)

Minimum tension	N (lbf)	265 (60)
Value for retightening	N (lbf)	355 ± 20 (80 ± 5)
New belt	N (lbf)	535 ± 45 (120 ± 10)

Lubricating system



		B202	B234
Oil capacity including that in filter	litres (qts)	4,0 (4.2)	4,3 (4.5)
Volume between MAX and MIN marks on dipstick	litres (qts)	1,0 (1.05)	1,0 (1.05)
Grade of oil		To API Service SF/CC, SF/CD or SG	
Viscosity		SAE 10W-30 or 10W-40. Where these are unavailable, 15W-40 may be used. In climates with temperatures regularly below -20°C (-4°F) use 5W-30.	

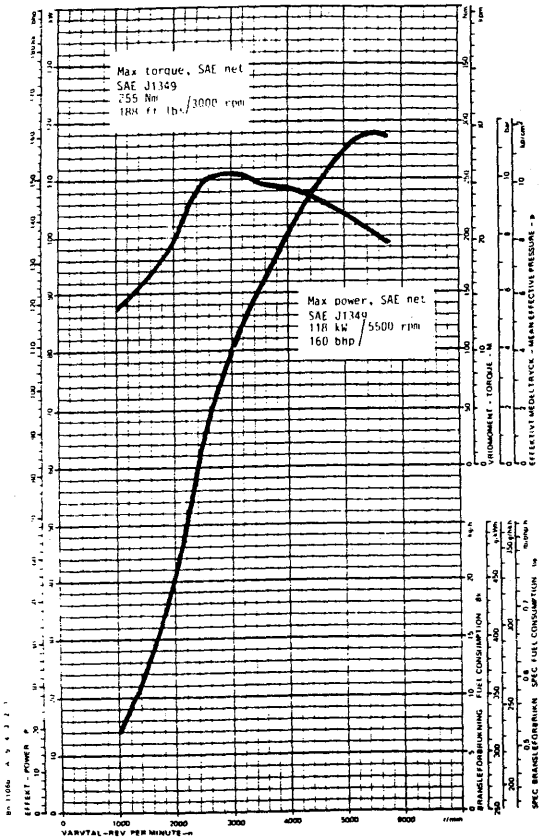
Note
The recommended grades of oil contain all necessary additives. The use of additional additives should therefore be avoided.

Oil pressures

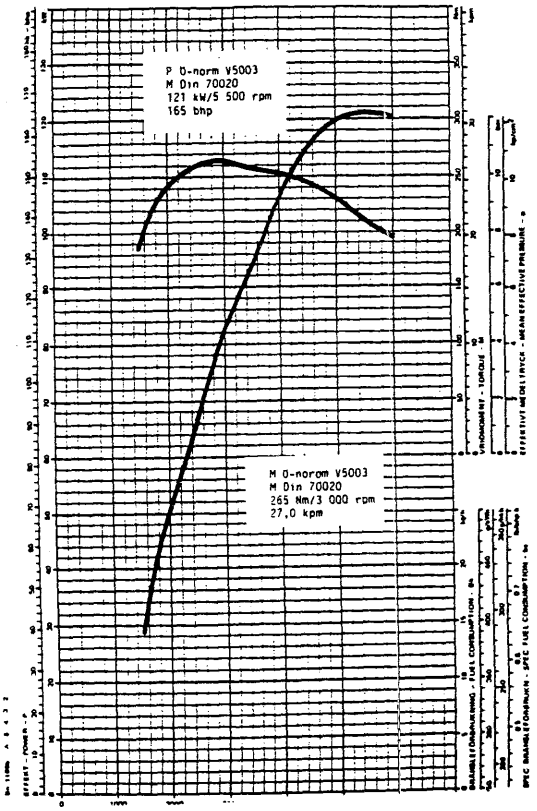
		B202	B234
Oil pump reducing valve opens at:	bar (psi)	3,6-5,2 (52.2-75.4)	3,5 (50.8)
Warning light comes on at:	bar (psi)	0,3-0,5 (4.4-7.2)	0,3-0,55 (4.4-8.0)
Oil pressure at 2000 rpm, engine temp of 80°C and 10W-30 oil	bar (psi)	min 2,7 (38.9)	min 2,7 (38.9)
End float between pump rotor and housing	mm (in)	0,03-0,08 (0.0012-0.0031)	0,03-0,08 (0.0012-0.0031)
Engine oil cooler thermostat opens at:	°C (°F)	90 (194)	75 ± 2 (167 ± 4)

Engine performance graphs

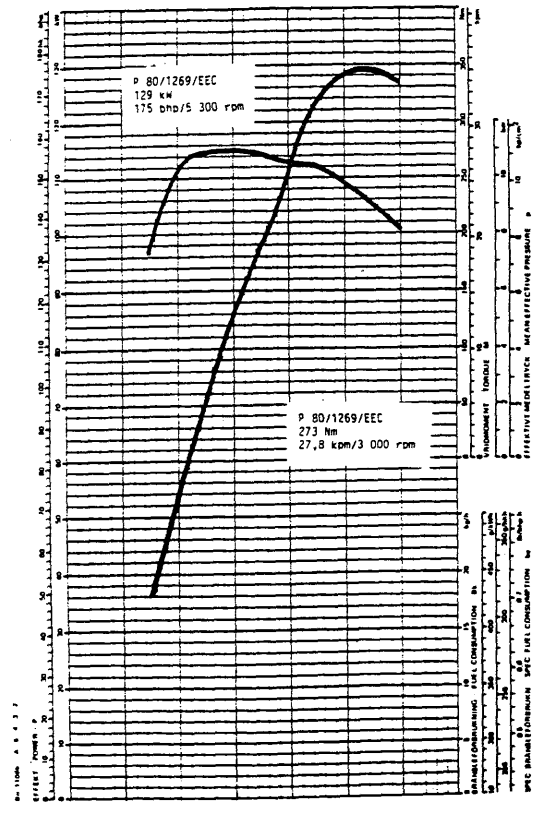
9000 Turbo cat pre-M88



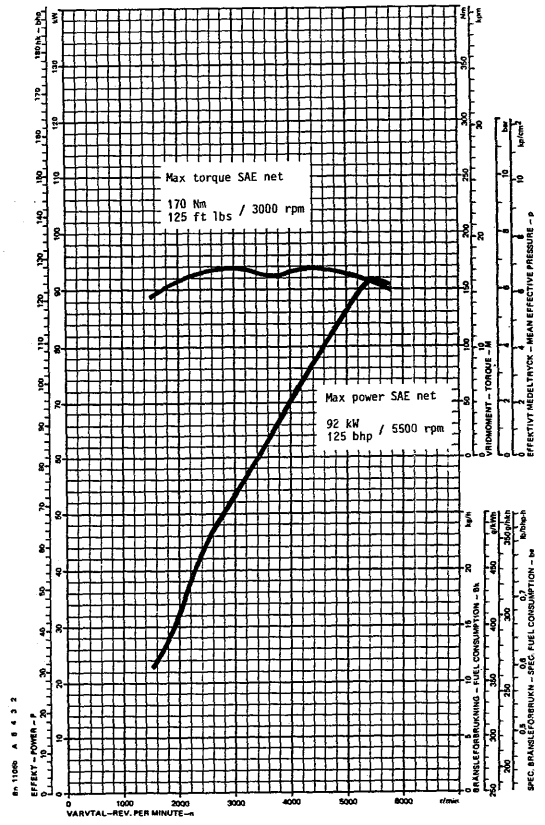
9000 Turbo cat M89 onwards



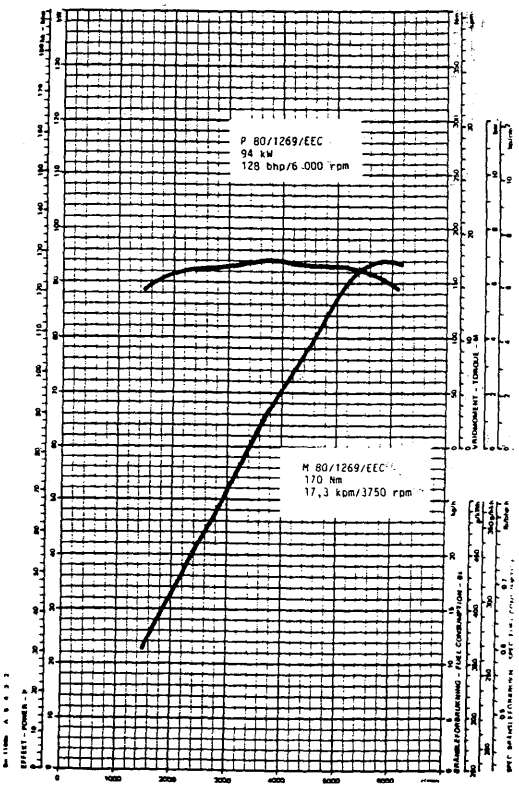
9000 Turbo



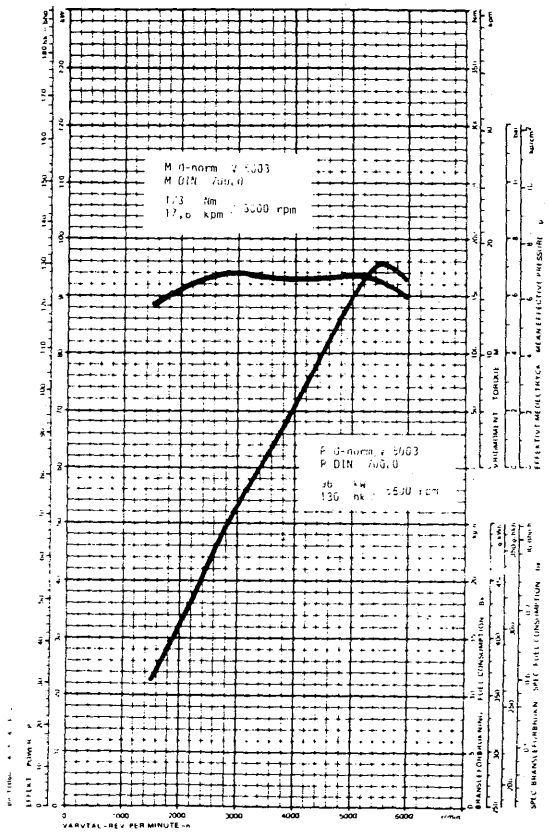
9000i cat pre-M88



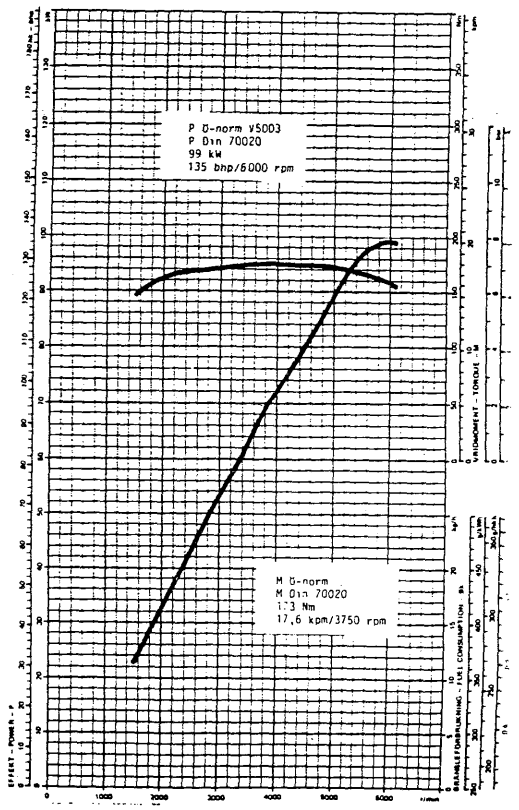
9000i cat M89 onwards



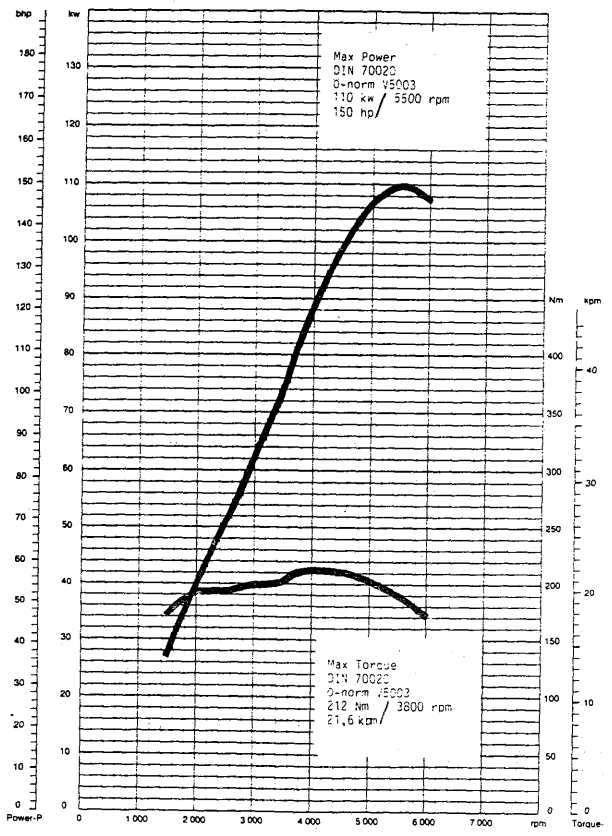
9000i pre-M88



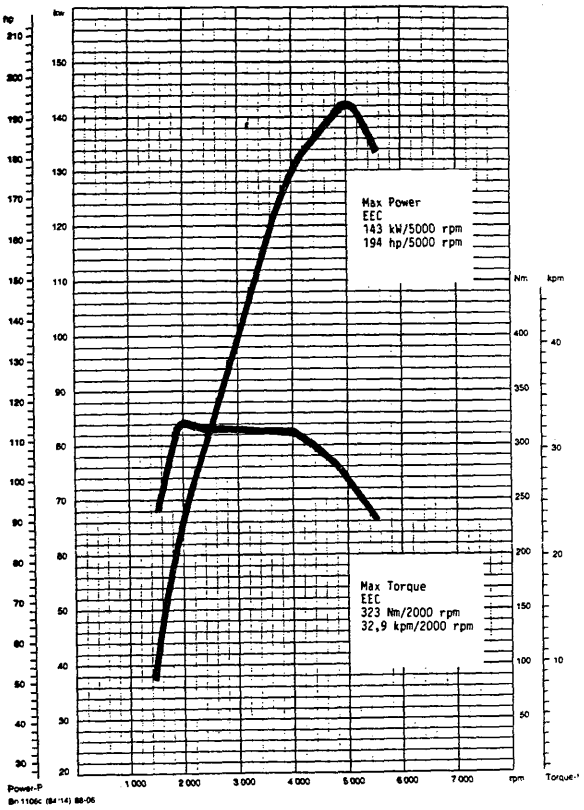
9000i M89 onwards



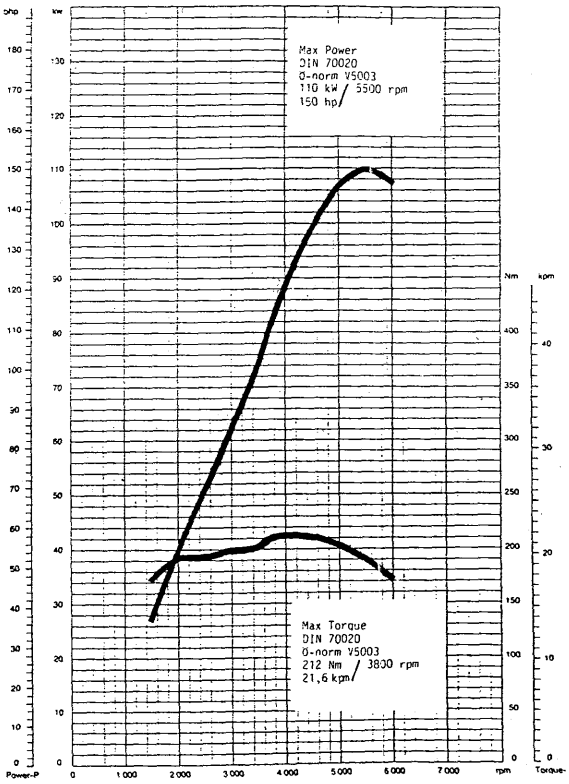
9000i 2.3 cat



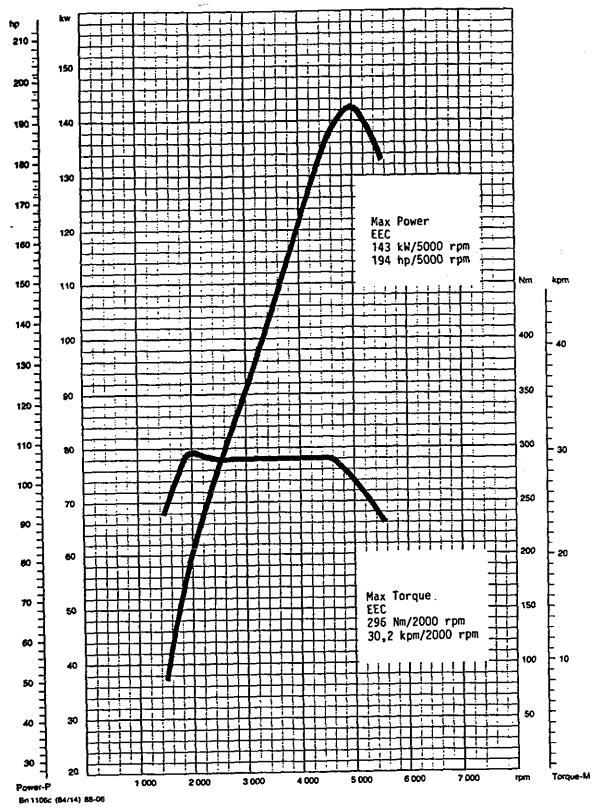
9000 Turbo B234 manual



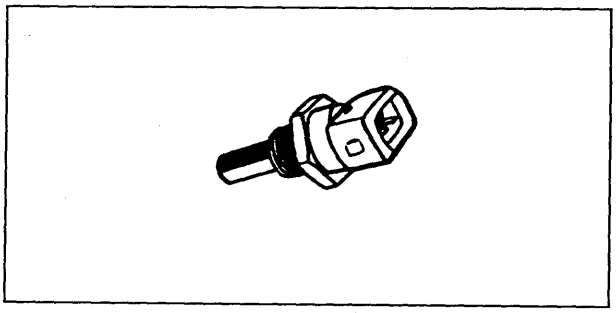
9000i 2.3 non-cat



9000 Turbo B234 aut



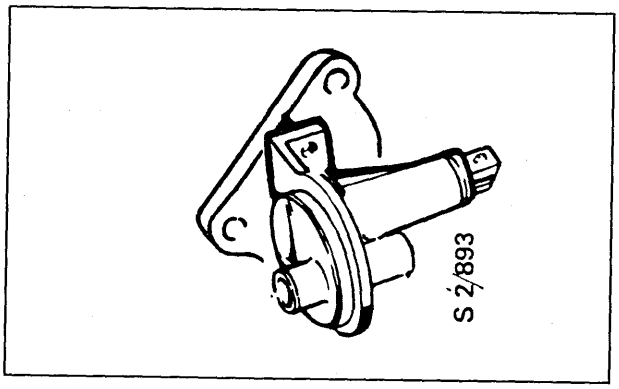
LH fuel-injection system



Temperature sensor

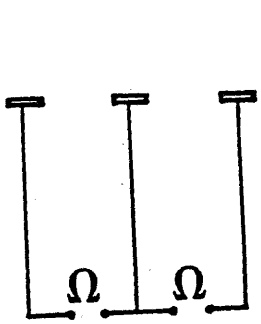
Designation		9357021 (Bosch 0280130026) or 8788200 (Bosch 0280130032) (cars with TCS)
Resistance at 0°C (32°F)	Ohm	5800
20°C (68°F)	Ohm	2600
80°C (176°F)	Ohm	320

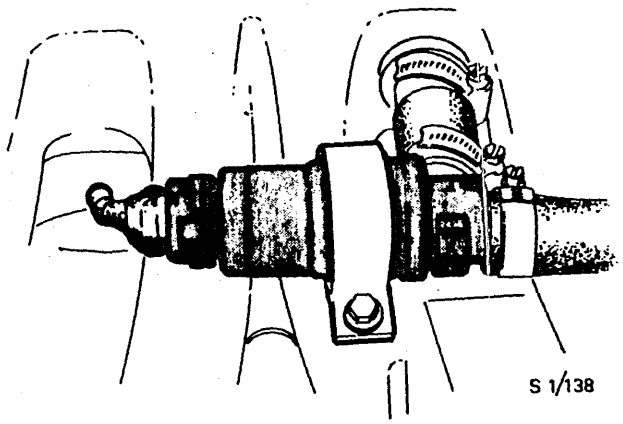
Note: Temperature sensor 87 88 200 incorporates two parallel circuits. The above values apply to each circuit individually.



Auxiliary air valve (M85)

Resistance at 20°C (68°F)	Ohm	40-60





AIC valve, M86 onwards

Resistance at 20°C (68°F),		
LH2.2	Ohm	20 ± 5 (terminals 2-1 and 2-3)
LH2.4,LH2.4.1	Ohm	7 ± 5 (terminal 1-2)
LH2.4.2 (M91-)	Ohm	12 ± 3 (terminals 2-1 and 2-3)

Full-load enrichment

Throttle-position sensor LH 2.2, 2.4, 2.4.1 (butterfly angle when contacts closed)	Degrees	Approx 72
CO value at simulated full-load enrichment (n/a cat)	%	4-6
Throttle potentiometer (LH 2.4.2 only): voltage across pins 2 -3 with ignition on		
Position for idling	V	0,25
Position for full load	V	4,0

Fuel pump

Capacity	cm^3/30 s	min 900
Resistance of fuel-level sensor (B234), tank full	Ohm	350
Resistance of fuel-pressure sensor (B234), tank empty	Ohm	35

Fuel tank

Capacity, M85-89	litres (qts)	68 (71)
M90, M92-	litres (qts)	66 (69)
M91	litres (qts)	62 (65)
Amount left in tank when fuel warning light comes on	litres (qts)	Approx 7 (7.4)

CO content at idling speed of 850 rpm (n/a cat)

Engine	Model	CO %
B202 Turbo	1985-	1,3 ± 0,3
B202i	1986-	1,0 ± 0,5
B234i	1991-	1,0 ± 0,5

Lambda pulse ratio (LH 2.2)

Idling speed: 850 ± 75 rpm

Engine	Model	Pulse ratio	Remarks
B202	1985-1988	50/50	Measured using ISAT or pulse-ratio meter 8393597

Air mass meter

The voltage is proportional to the load on the engine: the higher the load the higher the voltage. Depending upon the system, operating temperature 100-155°C (212-311°F) above the temperature of the inlet air. Approximate filament burn-off temperature: 1,000°C (1,830°F).

Note

An air mass meter with plastic casing must never be replaced by one with an aluminium casing and vice versa.

Oxygen (Lambda) sensor

The signal is 0°1 V when the system is operating. The preheater resistance is 4 ± 2 ohm.

Injectors

Delivery flow

Fuel-pressure regulator opening pressure (bar)	min (ml/30 s)
2,5 (Turbo M85 -86)	104
28 (Turbo non-cat, M87 onwards)	110
3,0 (i/s)	90
3,0 Turbo	145

Check that the delivery flow is the same for all injectors.

The specified values are valid at 20 ± 1°C.

The opening duration of the injectors is proportional to the load on the engine: the greater the load, the greater the injection duration.

Overview of LH-system ECUs

To simplify the handling of LH-system ECUs, a summary has been compiled of all existing units.

The summary is split into two tables: Table A for cars equipped with catalytic converter, and Table B for those without.

Tabel A. Specification of fuel-injection systems Cars with catalytic converter

Variant	MY	Engine	LH	Fuel-pressure regulator			Air mass meter (AMM)		Injectors		LH-system ECU	
				bar	Bosch	SAAB	Bosch	SAAB	Bosch	SAAB	Bosch	SAAB
9000iM, iA	-87	B202	2.2	3,0	-258	7580160	[1]-009	9390428	-711	7560162	-532	9389768
-"-	-88	-"-	2.4	-"-	-256	7564123	[2]-011	7538663	-"-	-"-	-552	7538671
-"-	-89	-"-	-"-	-"-	-706	7486921	-"-	-"-	-"-	-"-	-565	7487143
-"-	-90	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-584	9119470
-"-[C]	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-581	9119496
-"-	-"-	B234	2.4.1	-"-	-"-	-"-	[3]-019	9113838	-002	9113721	-579	9113804
-"-	-91	-"-	2.4.2	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-905	7872237
-"-[C]	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-906	7872245
-"-	-"-	B202	2.4	-"-	-"-	-"-	[2]-011	7538663	-711	7560162	-584	9119470
9000 LM[A]	-86	B202	2.2	2,5	-257	7580152	[1]-005	9375643	-712	7560170	-531	9389750
-"-[A]	-87	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-
9000 LA [B]	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-539	9391178
9000 LM[B],LA	-88	-"-	-"-	-"-	-255	7564131	-"-	-"-	-"-	-"-	-"-	-"-
-"-	-89	-"-	2.4	-"-	-704	7486905	[2]-013	7538655	-"-	-"-	-566	8978355
-"-	-90	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-586	9119488
-"-[C]	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-583	8787079
9000 LM, LA	-91	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-940	9126194
-"-	-"-	B234	2.4.2	3,0	-524	9131061	[8]-012	9113846	-009	8857153	-908	8857187
9000 LM[13]	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-910	7872260
-"-[13]	-"-	B202	2.4	2,5	-704	7486905	-013	7538655	-712	7560170	-941	9126202
9000iM, iA	-92	B202	2.4	3,0	-706	7486921	-011	7538663	-711	7560162	-584	9119470
-"-	-"-	B234	2.4.2	-"-	-"-	-"-	-019	9113838	-002	9113721	-905	7872237
9000 LM, LA	-"-	B202	2.4	-"-	-"-	7486905	-"-	7538655	-"-	7560170	-"-	9126194
9000 LM[13]	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	9126202
9000 LM, LA	-"-	B234	2.4.2	-"-	-"-	9131061	-"-	9113846	-"-	8857153	-"-	8857187
-"-[13] man+aut TCS	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	7872260

[1]AMM 1, aluminium 100°

[2]AMM 2/4.7, plastic 120°

[3]AMM 2/4.7, plastic 155°

[8]AMM 2/6.4, plastic 155°

[13]With TCS

[14]With TCS

[A]Air cleaner in engine bay

[B]Air cleaner in wheel arch

[C]EGR (US/Cal)

[D]With TCS

Tabel B. Specification of fuel-injection systems

Cars without catalytic converter

Variant	MY	Engine	LH	Fuel-pressure regulator			Air mass meter (AMM)		Injectors		LH-system ECU	
				bar	Bosch	SAAB	Bosch	SAAB	Bosch	SAAB	Bosch	SAAB
9000iM, iA	-86	B202	2.2	3,0	-258	7580160	[1]-009	9390428	-711	7560162	-530	9388513
-"-	-87	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-
-"-	-88	-"-	-"-	-"-	-"-	-"-	[2]	7591183	-"-	-"-	-553	7591498
9000 iM	89-90	-"-	-"-	-"-	-706	7486921	-"-	-"-	-"-	-"-	-574	9114711
9000 iA	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-567	7487127
9000 iM, iA	-91	-"-	2.4.2	-"-	-"-	-"-	[3]-022	7872385	-"-	-"-	-903	7872203
9000 iA	-"-	B234	-"-	-"-	-"-	-"-	-"-	-"-	-002	9113721	-907	7872229
9000 LM	-85	B202	2.2	2,5	-225	7518681	[1]-005	9375643	-712	7560170	-519	9388471
-"-	-86	-"-	-"-	-"-	-257	7580152	-"-	-"-	-"-	-"-	-534	9389545
-"-	-87	-"-	-"-	2,8	-265	7568058	-"-	-"-	-"-	-"-	-548	9393463
9000 LA	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-540	9391186
9000 LM, LA	-88	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-
9000 LM	-89	-"-	-"-	-"-	-705	7486913	[2]-017	8978280	-"-	-"-	-575	9114729
9000 LA	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-555	8975294
9000 LM	-90	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-587	9119520
9000 LA	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-"-	-588	9119538
9000 LM, LA	-91	-"-	2.4.2	-"-	-"-	-"-	[3]-018	7872393	-"-	-"-	-904	7872211
9000iM, iA	-92	B202	2.4.2	3,0	-706	7486921	-022	7872385	-711	7560162	-903	7872203
9000iA	-"-	B234	-"-	-"-	-"-	-"-	-"-	-"-	-002	9113721	-907	7872229
9000 LM, LA	-"-	B202	-"-	2,8	-705	7486913	-018	7872393	-712	7560170	-904	7872211

[1]AMM 1, aluminium 100°

[2]AMM 2/4.7, plastic 120°

[3]AMM 2/4.7, plastic 155°

[D]With TCS

Tabel C. Specification of LH-system components

Component	LH system				Car variants	Bosch	Saab
	2.2	2.4	2.4.1	2.4.2			
Temperature sensor	x				9000 Turbo cat. aut. trans. M87-88	-055	7563562
Temperature sensor		x		x	TCS	-032	8788200
Temperature sensor	x	x	x	x	Other	-026	9357021
Oxygen (Lambda) sensor	x	x			9000i M87-M89	-009	7525603
Oxygen (Lambda) sensor		x	x	x	9000i M90-M91, 9000i M86, 9000 Turbo M85-M91	-028	9392762
Oxygen (Lambda) sensor		x		x	M92-	-245	9132564
Oxygen (Lambda) sensor	x	x	x	x	9000 Turbo Brazil-spec. -M91	-095	9129743
Oxygen (Lambda) sensor	x	x	x	x	9000 Turbo Brazil- and ME-spec. M92	-258	4164323
Knock detector	x				All	-001	9358037
Knock detector[1)]	x	x	x	x	All	-006	7568801
Knock detector	x	x	x	x	Saab DI	-	7585755
Thottle-position sensor	x	x	x		All except cars with LH 2.4.2	-300	7501612
Throttle potentiometer DKG				x	2.4.2 M91-	-001	8857195
AIC valve ZWD2	x				M86-	-502	7516792
EWD		x	x		2.4 M88-, 2.4.1 M90	-516	7586019
ZWD3				x	B234 Turbo M91-	-526	8787996
ZWD3				x	Other 2.4.2 M91-	-505	8857179
Auxiliary air valve	x				M85	-107	8357832
Cold-start valve KSV		x			9000i with catalytic conv.	-432	7486129
Charcoal canister	x				ME-spec. cars with catalytic converter	-	7532054
Charcoal canister excluding TEV		x	x	x	All	-	7539216
ELCD valve TEV		x	x	x	All	-157	7539257
Bypass valve	x	x	x	x	All Turbos	-103	9390022

[1)]Engine number G122319-

Fuel-pressure regulator check values

	Turbo -1986	Turbo 1987-	B202i 1986- B234T 1991-
Line pressure, bar (psi)	2,5 (36)	2,8 (40)	3,0 (43)
+0,2 (+2.9)	2,7 (39)	3,0 (43)	3,2 (46)
+0,4 (5.8)	2,9 (42)	3,2 (46)	3,4 (49)
+0,6 (8.6)	3,1 (45)	3,4 (49)	3,6 (52)
atm bar (psi)	2,5 (36)	2,8 (40)	3,0 (43)
-0,6 (8.6)	1,9 (28)	2,2 (32)	2,4 (35)
-0,4 (5.8)	2,1 (30)	2,4 (35)	2,4 (35)
-0,2 (2.9)	2,3 (33)	2,6 (37)	2,8 (40)

Tolerances:

2,5 + 0,25/-0,15 bar (36 + 3.6/-2.3 psi)

2,8 + 0,25/-0,15 bar (40 + 3.6/-2.3 psi)

3,0 + 0,25/-0,15 bar (43 + 3.6/-2.3 psi)

Permitted tolerances on checking with workshop equipment and with due allowance for temperature, fuel quality and instrument error: +5%

Turbo system

Maximum boost pressure at 3,000 rpm, non-cat.	bar (psi)	0,85 ± 0,05 (12.3 ± 0.7)
cat.	bar (psi)	0,75 ± 0,05 (10.8 ± 0.7)
Basic charging pressure at 3,000 rpm, non-cat.	bar (psi)	0,40 ± 0,03 (5.8 ± 0.4)
cat.	bar (psi)	0,35 ± 0,03 (5.0 ± 0.4)
Basic charging pressure at 3,000 rpm, B234 Turbo cat.	bar (psi)	0,4 ± 0,03 (5.8 ± 0.4)
Maximum boost pressure at 3,000-3,500 rpm, B234 Turbo cat., manual	bar (psi)	1,0 (14.5)
Maximum boost pressure at 2,700 rpm, B234 Turbo cat., automatic	bar (psi)	0,77 (11,2)
Pressure switch tripping pressure, non-cat.	bar (psi)	1,10 ± 0,05 (16.0 ± 0.4)
cat.	bar (psi)	0,95 ± 0,03 (13.8 ± 0.4)

Turbo unit

Turbo-shaft bearing clearance:		T3	T25
end float	mm (in)	0,013-0,081 (0.0005-0.0032)	0,025-0,084 (0.0010-0.0033)
radial clearance	mm (in)	0,076-0,145 (0.0030-0.0057)	0,056-0,127 (0.0022-0.0050)

Throttle dashpot (LH2.2)

Return time from 3,000 rpm to idling speed	s	3-6
Setting speed	r/min	2600 ± 100

Exhaust emission control systems (Cars without catalytic converter)

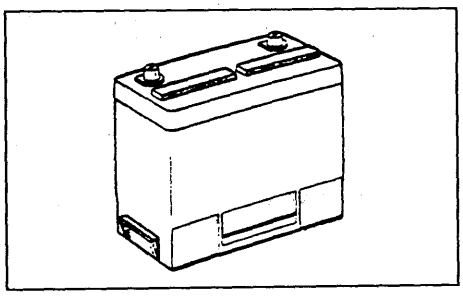
		Turbo	Normally aspirated
EGR valve: type		Proportional	Proportional
Maximum flow	kg/h (lb/h)	20 (44)	10 (22)
Colour code		Blue	Black
Restriction, M85	mm (in)	Ø 4,3 (0.17)	Ø 6,0 (0.24)
Restriction, M86 onwards	mm (in)	Ø 4,7 (0.185)	
Opening temperature of thermostatic valve	°C (°F)	30 (86)	30 (86)
Closing temperature of thermostatic valve	°C (°F)	20 (68)	20 (68)

Cooling system

Coolant type		Saab Original coolant
Capacity	litres (qts)	8,65 (9.10)
Opening temperature of thermostat	°C (°F)	89 ± 2 (192 ± 4) *)
Expansion tank relief valve opens at:	bar (psi)	0,9-1,2 (13.0-17.4)
Cut-in temperature for fan	°C (°F)	90-95 (194-203)
Cut-out temperature for fan	°C (°F)	85-90 (185-194)

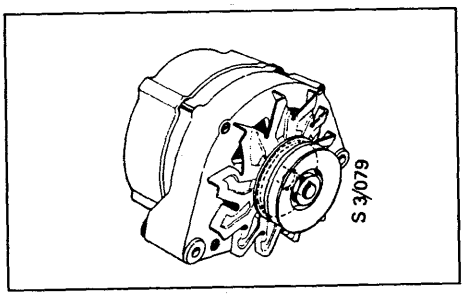
*) 82 ± 2 (180 ± 4) on some markets

Electrical system



Battery

Voltage	V	12
Capacity	Ah	62
Polarity		Negative (-) earth (-)
Specific gravity of electrolyte:		
Recharging required		1,21
Battery fully charged		1,28



Alternator

Bosch K1-14V 70A 20

Rated voltage	V	14
Rated speed	r/min	2000
Stator connection		Delta connection
Slip-ring diameter, new	mm (in)	27,8 (1.09)
minimum	mm (in)	26,8 (1.06)
Maximum permissible runout, slip rings	mm (in)	0,03 (0.001)
rotor	mm (in)	0,05 (0.002)
Minimum brush length (projecting from brush holder)	mm (in)	5 (0.2)
Gear ratio between crankshaft pulley and alternator		1:2,4

Test values

Resistance, rotor winding	Ohm	2,8 ± 10%
Between stator phases	Ohm	0,09 ± 10%
Output current at:		
1500 r/min	A	27
2000 r/min	A	46
6000 r/min	A	70

Bosch N1-14V 80A 19, Bosch N1-14V 36/80A

Rated voltage	V	14
Rated speed	r/min	1900
Stator connection		Star connection
Slip-ring diameter, new	mm (in)	27,8 (1.09)
minimum	mm (in)	26,8 (1.06)
Maximum permissible runout, slip rings	mm (in)	0,03 (0.001)
rotor	mm (in)	0,05 (0.002)
Minimum brush length (projecting from brush holder)	mm (in)	5 (0.2)
Gear ratio between crankshaft pulley and alternator		1:2,4

Test values

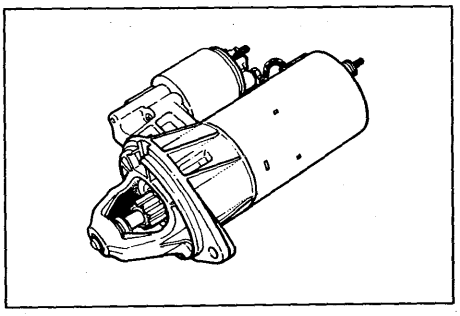
Resistance, rotor winding	Ohm	2,8 ± 10%
Between stator phases	Ohm	0,10 ± 10%
Output current at:		
1500 r/min	A	36
1900 r/min	A	54
6000 r/min	A	80

Bosch N1-14V 40/115A

Rated voltage	V	14
Rated speed	r/min	1900
Stator connection		Star connection
Slip-ring diameter, new	mm (in)	27,7 (1.09)
minimum	mm (in)	27,2 (1.07)
Maximum permissible runout, slip rings	mm (in)	0,02 (0.0008)
rotor	mm (in)	0+0/-0,087 (0+0/-0.0035)
Minimum brush length (projecting from brush holder)	mm (in)	5 (0.2)
Gear ratio between crankshaft pulley and alternator		1:2,4

Test values

Resistance, rotor winding	Ohm	2,6 ± 0,15
Between stator phases	Ohm	0,05+0,01/-0
Output current at:		
1500 r/min	A	40
1900 r/min	A	62
6000 r/min	A	115



Starter motor

Type		Pre-M87: Bosch DW 12V 0 001 108 012; M86 onwards: Bosch DW 12V 0 001 108 038.
Output	kW (bhp)	1,4 (1.9)
Number of teeth on pinion		9
Number of teeth on ring gear		142
Gear ratio		1:15,8

Check values-mechanical

Backlash	mm (in)	0,35-0,60 (0.014-0.024)
Clearance between pinion and ring gear	mm (in)	2,5-3,0 (0.1-0.12)
Rotor end float	mm (in)	0,05-0,40 (0.002-0.016)
Torque of freely rotating pinion	Nm (lbf ft)	0,12-0,18 (0.09-0.13)

Check values-electrical

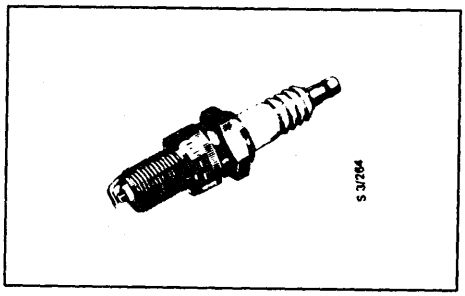
Idling: 12 V and 70 A	r/min	3000
Under load: 9 V and 315 A	r/min	1700
Starter motor stalled: 4 V and 650-750 A	r/min	0
Minimum voltage for solenoid engagement	V	7

Tightening torques

Solenoid securing bolts	Nm (lbf ft)	4,5-5,5 (3.3-4.1)
Commutator end bracket securing bolts (through-bolts)	Nm (lbf ft)	2,7-3,5 (2.0-2.6)

Ignition system (cars without Saab DI)

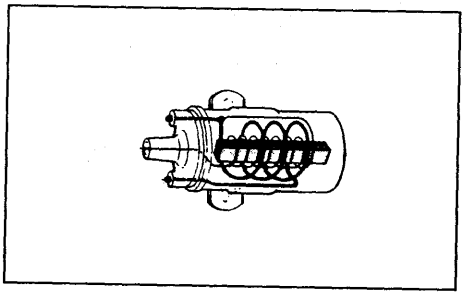
Type	Breakerless with Hall-effect device
Firing order	1-3-4-2



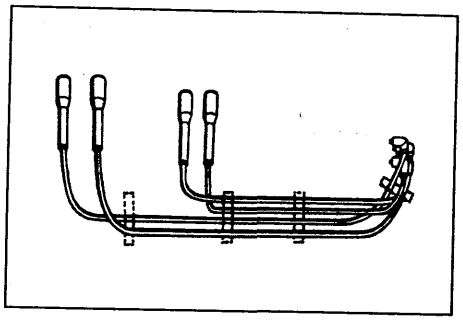
Spark plugs

Engine	Type	Remarks
B202i	NGK BCP 5 ES (–1991) NGK BCP 5 EV (1992–) Champion RC12YC Bosch FR8DCX	
B202 Turbo	NGK BCP 7 EV Champion C7GY	precious metal precious metal
Change interval		See appropriate service schedule
Electrode gap mm (in)	0,6-0,7 (0.02-0,03)	
Tightening torque (non-lubricated plugs) Nm (lbf ft)	25-29 (18.5-21.5)	

Ignition coil



Resistance of primary winding, measured between terminals 1 and 15	ohm	0,52-0,76
Resistance of secondary winding, measured between terminal 1 and HT terminal	kohm	7,2-8,2

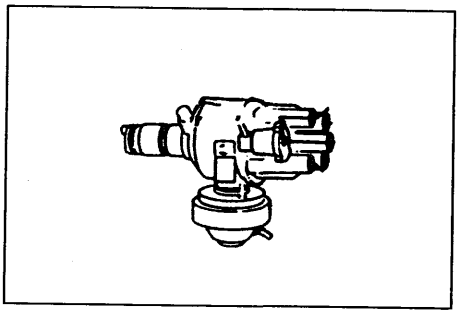


HT leads

Resistance of lead, including connectors, between coil and distributor	kohm	0,5-1,5
Resistance of lead, including connectors, between distributor and plug	kohm	2-4

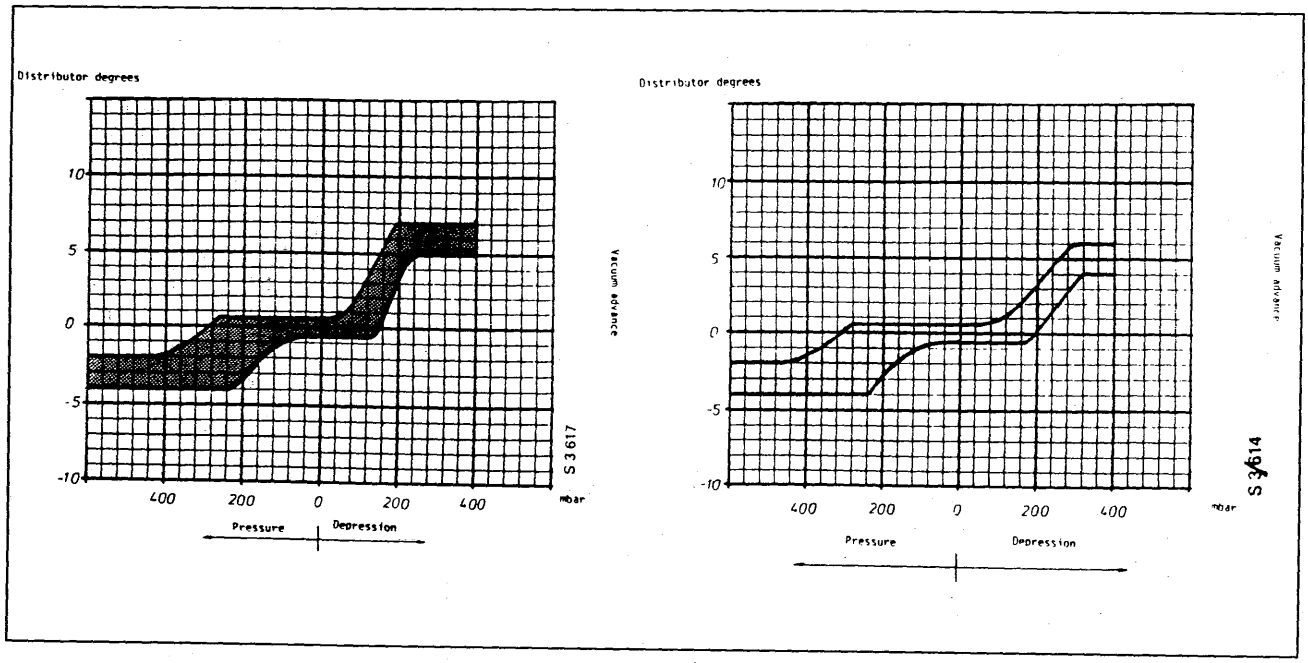
Ignition timing with vacuum control disconnected

Engine	Timing BTDC at rpm	Remarks
Turbo 16	16° 850	
Injection 16	14° 850	



Distributor

Type designation, injection engine		Bosch 0 237 506 009 M86-M88 Bosch 0 237 506 013 M88 (option) Bosch 0 237 501 010 M89-
Turbo		Bosch 0 237 507 001 M85 Bosch 0 237 507 006 M86 (n/a US) Bosch 0 237 507 007 M86 (US), M87-M88 Bosch 0 237 507 008 M88 (option), M89 (US)
Direction of rotation		Anticlockwise
Rotor-arm resistance	kohm	1



Ignition timing graph - Bosch 0 237 507 006

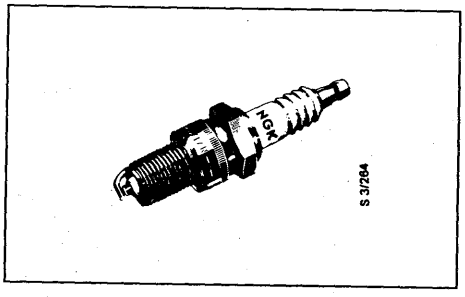
Ignition timing graph - Bosch 0 237 507 007

Output module

Type, Turbo	Bosch 0 227 100 139
Injection	Bosch 0 227 100 124

Ignition system (cars with Saab DI)

Type	Saab DI
Firing order	1-3-4-2



Spark plugs

Engine	Type	Remarks
B202 Turbo	NGK BCPR 7ES	
B234i	NGK BCPR 6ES	
B234 Turbo	NGK BCPR 7ES	
Change interval		See appropriate service schedule
Electrode gap mm (in)	1,0 + 0,1/-0,2 (0.04 + 0.004/-0,008)	
Tightening torque (non-lubricated plugs) Nm (lbf ft)	25-29 (18.5-21.5)	

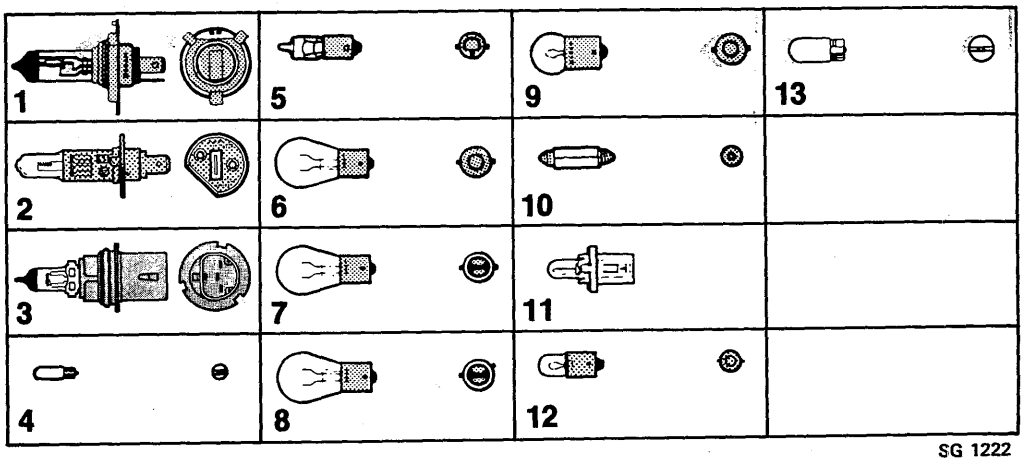
Ignition cartridge

Tightening torque	Nm (lbf ft)	12 (8.9)

Ignition timing

Preprogrammed in ECU. Cannot be adjusted.

Bulbs



	Wattage	Fitting	Item number
Headlamp (9000 5-door, 9000 CD)	60/55	H4 socket P43t-38	1
Headlamp (9000 CS)	55	H1 socket	2
Headlamp, US, JP	70/50	Sylwania 9004 DOT 12 V	3
Rear direction indicator, stop light, reversing light, high-level stop light*, side reversing light*	21	BA 15s	6
Front direction indicator/side marker light*, cornering light*, daylight driving light (pre- M87)/parking light	21/5	BAY 15d	7
Parking light (9000 CS)	4	BA 9s	12
Rear fog light*/tail light	21/4	BAZ 15d	8
Tail light	5	BA 15s	9

*) Certain markets/models only

	Wattage	Fitting	Item number
Number-plate light, interior light rear-view mirror, glove compartment, centre-console light, door courtesy light, seat-belt indicator light	5	SV 8,5-8	10
Ceiling dome light, luggage-compartment light	10	SV 8,5-8	10
Switch illumination, front-ashtray light	1,2	W2x4,6d	4
Warning/indicator lights: oil pressure, footbrake, direction indicators, rear-window heating, main beam, handbrake, washer-fluid level, pictogram, gear shift-up*, rear fog light*, ABS brakes*, CHECK ENGINE*, Airbag SRS*, Traction Control System TCS*	1,12	Bulb and bulb holder	11
Fuel warning light	1,2	Bulb and bulb holder	11
Charging warning light	2,0	Bulb and bulb holder	11
Illumination for heating and ventilation controls, and cigar lighter	2	W2x4,6d	4
Instrument illumination	3	Bulb and bulb holder	11
Map-reading light on overhead switch panel, C-pillar reading light (halogen)	5	-	5
Side direction indicators, high-level stop light (9000 CS)**	5	W2,1x9,5d	13
Engine-bay light (M87 onwards)	15	SW8,5	10

*) If fitted

*) To meet current legal requirements in England, two of the bulbs must be rated at 3 W

Fuses

Brown	5 A
Red	10 A
Blue	15 A
Yellow	20 A
Clear	25 A
Green	30 A

Other electrical equipment

Windscreen-wiper motor

		-1989	1990-
Speed (double sweeps/min) and power consumption at 13.5 V			
Wet screen, half speed	(A)	44 ± 4 (≤3)	44 +3/-4 (≤4,5)
Wet screen, maximum speed	(A)	64 ± 6 (≤4)	64,5 ± 4,5 (≤7)
Power consumption if motor immobilized (e.g. wiper blades frozen to screen)	A	Approx. 20	≤40

Headlight-wiper motor

Speed (double sweeps/min)		50-66
Power consumption	A	0,5-1,0
Power consumption if motor immobilized (e.g. wiper blades frozen fast)	A	max 6,5

(An integral PTC resistor, connected in series, prevents the motor from being overloaded)

Rear window wiper motor

Speed, wet glass (double sweeps/min)		38 ± 5
Power consumption, wet glass	A	max 4,5
Power consumption, no load	A	2,0
Power consumption if motor immobilized (e.g. wiper blades frozen fast)	A	max 14,0

(An integral PTC resistor, connected in series, prevents the motor from being overloaded)

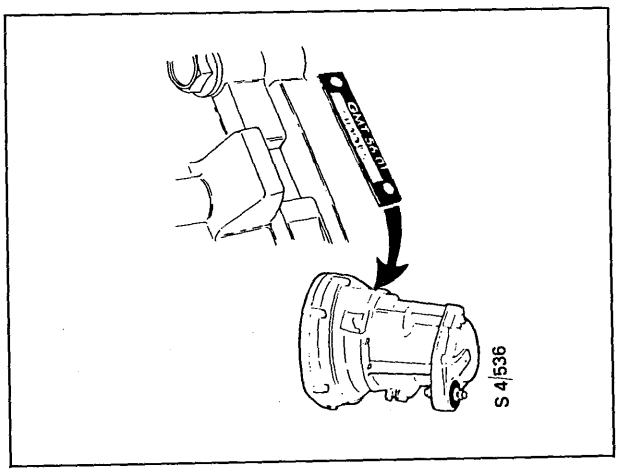
Heated front seats

Power at 12.5 V:	Contour upholstery W	80 ± 5
	Horizon upholstery W	90 ± 5

Rear-window heater

Power at 12.5 V: 9000 5-door	W	235 ± 20
9000 CD	W	190 ± 20
9000 CS	W	250 ± 20

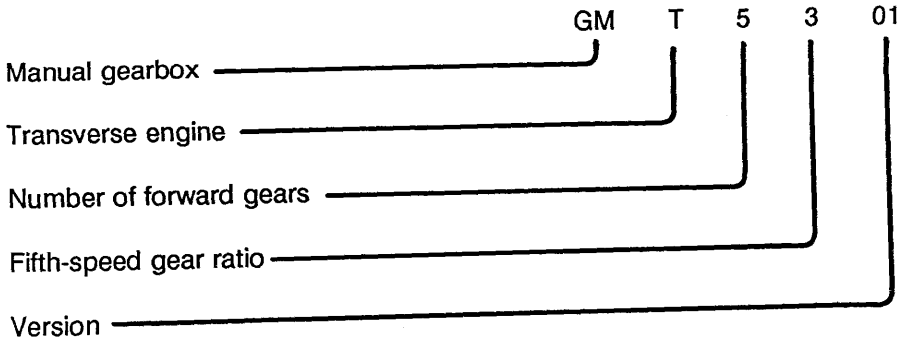
Transmission



Gearbox number

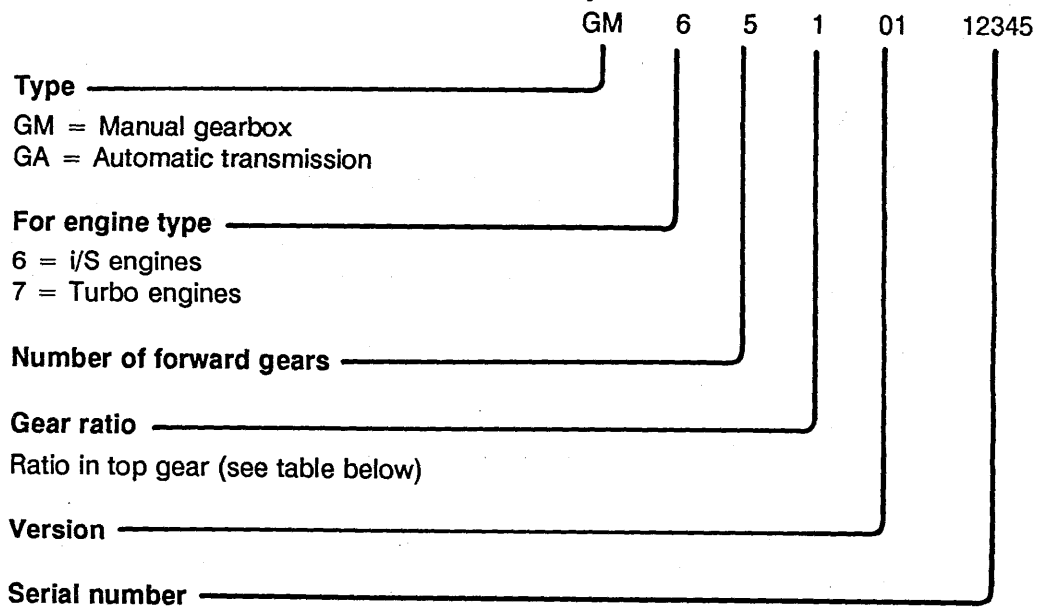
Type designations (pre-M88)

The type designation is stamped adjacent to the gearbox number and is made up as follows:



Serial number: 300,000 series

Type designation (M88 onwards)



Ratio in top gear

Code	0	1	2	3	4	5	6	7	8	9
Ratio	3,2	3,1	3,0	2,9	2,8	2,7	2,6	2,5	2,4	2,3

Type designations

Manual gearbox		Type designation	Automatic transmission		Type designation
B202 Turbo engine	1985	GMT 5301	B202 Turbo engine	1987	GAT 4301
	1986	GMT 5301		1988	GA 74301
	1987	GMT 5401		1989	GA 74302
	1988	GM 75401		1990	GA 74303
	1989	GM 75301		1991	GA 74303
	1990	GM 75402		1992	GA 74307
	1991	GM 75402			
	1992	GM 75402			
B202 injection engine	1986	GMT 5101	B202 injection engine	1987	GAT 4102
	1987	GMT 5202		1988	GA 64101
	1987	GMT 5203		1989	GA 64102
	1988	GM 65101		1990	GA 64103
	1989	GM 65102		1991	GA 64103
	1990	GM 65102 alt. 65103		1992	GA 64107
	1991	GM 65103			
	1992	GM 65103			
B234 Turbo engine	1991	GM 75403	B234 Turbo engine	1991	GA 74304
	1992	GM 75404		1992	GA 74306
B234 injection engine	1990	GM 65103	B234 injection engine	1990	GA 64104
	1991	GM 65103		1991 not US	GA 64104
	1992	GM 65103		1991 US	GA 64301
				1992 not US	GA 64106
				1992 US	GA 64302

Manual gearbox

Lubricants

Gearbox	Engine oil (mineral oil) to API SG or SF SAE 10W-30 or 10 W-40
Clutch release bearing	Factory sealed. Not to be washed.
Input shaft splines	Molybdenum paste on fitting
Gear-lever housing	Spray Gleitmo 980 on the housing and allow to dry for about 15 min. Then apply Gleitmo paste.
Master cylinder plunger and seals	Wakefield Girling Rubber Grease 3
Slave cylinder plunger and seals	Castrol UBCF 11
Inboard driver cup g	80 Esso Beacon EP 2, Mobil 525, Mobil EXF 57C
Inboard universal joint (including rubber gaiter) g	60 Esso Beacon EP 2, Mobil 525, Mobil EXF 57C
Intermediate shaft g	100 Esso Beacon EP 2, Mobil 525, Mobil EXF 57C
	Caution Keep Esso Beacon EP 2 grease off the paintwork to avoid discoloration.
CV joint g	80 Esso Nebula EP 2 (Saab Special chassis grease)
Clutch pedal pivot	Esso Nebula EP 2 (Saab Special chassis grease)
Sealant between gearbox and clutch housing	Loctite 510 (45) 3020468

Clutch

Make		Fichtel/Sachs or Borg/Beck
Type		Single dry-plate clutch of diaphragm-spring type
Operation		Hydraulic
Diameter	mm (in)	228 (9), 215 (8 1/2), 216 (8 1/2)

Gearbox

Oil capacity	litres (qts)	2,5 (2,65)
Grade of oil		Engine oil (mineral oil) to SAE 10 W-30, 10 W-40 or API SG or SF
Weight with oil	kg (lb)	47 (104)

Tightening torques

Output shaft bearing bracket	Nm (lbf ft)	26 ± 2 (19.2 ± 1.5)
Internal gear-selector mechanism	Nm (lbf ft)	22 ± 2 (16.3 ± 1.5)
Selector for reverse gear	Nm (lbf ft)	22 ± 2 (16.3 ± 1.5)
Selector shaft actuator	Nm (lbf ft)	22 ± 2 (16.3 ± 1.5)
Selector shaft to selector shaft universal joint	Nm (lbf ft)	30-33 (22.2-24.4)
Bolts securing clutch housing to gearbox	Nm (lbf ft)	22 ± 2 (16.3 ± 1.5)
Input shaft bearing bracket	Nm (lbf ft)	26 ± 2 (19.2 ± 1.5)
Slave cylinder bolts	Nm (lbf ft)	9 ± 1 (6.7 ± 0.7)
Crown wheel bolts	Nm (lbf ft)	90 ± 10 (66.6 ± 7.4)
Bearing retainer for LH driver cup	Nm (lbf ft)	22 ± 2 (16.3 ± 1.5)
Oil filter plug	Nm (lbf ft)	50 ± 10 (37.0 ± 7.4)
End-cover bolts	Nm (lbf ft)	22 ± 2 (16.3 ± 1.5)
Reversing-light switch	Nm (lbf ft)	22 ± 2 (16.3 ± 1.5)
Pressure plate	Nm (lbf ft)	20 ± 6 (14.8 ± 4.4)

Gear ratios

Year	Model	Gearbox no.	Final-drive ratio	Gear ratios					
				1	2	3	4	5	Reverse
1985	9000T	GMT 5301	19:80 4,21	13.93	7.42	4.91	3.61	2.88	13.53
1986	9000T	GMT 5301	20:77 3,85	13.93	7.42	4.41	3.61	2.88	13.53
1986	9000i	GMT 5101	19:80 4,21	13.93	7.42	4.91	3.83	3.07	13.53
1987	9000i	GMT 5202	20:89 4,45	14.72	7.84	5.25	3.80	3.04	14.30
1987	9000i	GMT 5203	20:89 4,45	14.72	7.84	5.25	3.80	2.99	14.30
1987	9000T	GMT 5401	19:80 4,21	13.93	7.42	4.97	3.60	2.83	13.53
1988	9000i	GM 65101	20:89 4,45	14.72	7.84	5.25	3.98	3.13	14.30
1988	9000T	GM 75401	19:80 4,21	13.93	7.42	4.97	3.60	2.83	13.53
1989	9000i	GM 65102	20:89 4,45	15.06	7.84	5.25	3.98	3.13	14.30
1989	9000T	GM 75301	19:77 4,05	13.72	7.13	4.78	3.62	2.85	13.03
1990	9000T	GM 75402	21:85 4,05	13.70	7.12	4.77	3.62	2.85	13.01
1990	9000i	GM 65102 or GM 65103	20:89 4,45	15.06	7.84	5.25	3.98	3.13	14.30
1991	9000T (B202)	GM 75402	21:85 4,05	13.70	7.12	4.77	3.61	2.85	13.01
1991	9000T (B234)	GM 75403	21:85 4,05	13.70	7.12	4.77	3.61	2.85	13.01
1991	9000i	GM 65103	20:89 4,45	15.06	7.83	5.25	3.98	3.13	14.30
1992	9000T (B202)	GM 75402	21:85 4,05	13.70	7.12	4.77	3.61	2.85	13.01
1992	9000T (B234)	GM 75404	21:85 4,05	13.70	7.12	4.77	3.61	2.85	13.01
1992	9000i	GM 65103	20:89 4,45	15.06	7.83	5.25	3.98	3.13	14.30

Road speeds

Year	Model	Gearbox no.	Tyres	Road speed at 1,000 rpm, km/h (mph)					
				1	2	3	4	5	Reverse
1985	9000T	GMT 5301	2)	8,1 (5.0)	15,1 (9.4)	22,9 (14.2)	31,2 (19.4)	39,2 (24.4)	8,4 (5.2)
1986	9000T	GMT 5301	4)	8,0 (5.0)	15,0 (9.3)	22,7 (14.1)	30,8 (19.1)	38,6 (24.0)	8,3 (5.2)
1986	9000i	GMT 5101	2)	8,0 (5.0)	15,1 (9.4)	22,7 (14.2)	29,4 (18.3)	36,9 (22.9)	8,4 (5.2)
1987	9000i	GMT 5202	1)	7,7 (4.8)	14,5 (9.0)	21,6 (13.4)	29,9 (18.6)	37,3 (23.2)	7,9 (4.9)
			2)	7,7 (4.8)	14,4 (8.9)	21,5 (13.4)	29,7 (18.4)	37,1 (23.0)	7,9 (4.9)
1987	9000i	GMT 5203	1)	7,7 (4.8)	14,5 (9.0)	21,6 (13.4)	29,9 (18.6)	38,0 (23.6)	7,9 (4.9)
			2)	7,7 (4.8)	14,4 (8.9)	21,5 (13.4)	29,7 (18.4)	37,7 (23.4)	7,9 (4.9)
1987	9000T	GMT 5401	1)	8,1 (5.0)	15,2 (9.4)	22,7 (14.1)	31,3 (19.4)	39,8 (24.7)	8,3 (5.2)
			2)	8,0 (5.0)	15,0 (9.3)	22,4 (13.9)	30,9 (19.2)	39,3 (24.4)	8,2 (5.1)
1988	9000i	GM 65101	1)	7,7 (4.8)	14,5 (9.0)	21,6 (13.4)	28,5 (17.7)	36,2 (22.5)	7,9 (4.9)
			2)	7,7 (4.8)	14,4 (8.9)	21,5 (13.4)	28,3 (17.6)	35,9 (22.3)	7,9 (4.9)
1988	9000T	GM 75401	3)	8,1 (5.0)	15,2 (9.4)	22,7 (14.1)	31,3 (19.4)	39,3 (24.7)	8,3 (5.2)
			4)	8,0 (5.0)	15,0 (9.3)	22,4 (13.9)	30,9 (19.2)	39,3 (24.4)	8,2 (5.1)
1989	9000i	GM 65102	1)	7,5 (4.7)	14,5 (9.0)	21,6 (13.4)	28,5 (17.7)	36,2 (22.5)	7,9 (4.9)
			5)/6)	7,7 (4.8)	14,7 (9.1)	22,0 (13.7)	29,0 (18.0)	36,8 (22.9)	8,1 (5.0)
			4)	7,4 (4.6)	14,2 (8.8)	21,2 (13.2)	28,0 (17.4)	35,5 (22.1)	7,8 (4.8)

1) 185/65 R15H: Dynamic rolling radius 301 mm
2) 195/60 R15H: Dynamic rolling radius 299 mm
3) 195/60 VR15: Dynamic rolling radius 299 mm
4) 205/55 VR15: Dynamic rolling radius 295 mm
5) 195/65 R15H: Dynamic rolling radius 306 mm
6) 195/65 VR15: Dynamic rolling radius 306 mm
7) 205/50 VR16: Dynamic rolling radius 297 mm
8) 205/50 ZR16: Dynamic rolling radius 297 mm
9) 205/60 ZR15: Dynamic rolling radius 306 mm
10) 195/65 TR15: Dynamic rolling radius 306 mm

1989	9000T	GM 75301	3)	8,2	15,8	23,6	31,1	39,6	8,7
				(5.1)	(9.8)	(14.7)	(19.3)	(24.6)	(5.4)
			6)	8,4	16,2	24,1	31,9	40,5	8,9
				(5.2)	(10.1)	(15.0)	(19.8)	(25.2)	(5.5)
			4)	8,1	15,6	22,3	30,7	39,0	8,5
				(5.0)	(9.7)	(14.5)	(19.1)	(24.2)	(5.3)
			7)	8,2	15,7	23,4	30,9	39,3	8,5
				(5.1)	(9.8)	(14.5)	(19.2)	(24.4)	(5.3)
1990	9000i	GM 65102	1)	7,5	14,5	21,6	28,5	36,2	7,9
		or 65103		(4.7)	(9.0)	(13.4)	(17.7)	(22.5)	(4.9)
			5)/6)	7,7	14,7	22,0	29,0	36,8	8,1
				(4.8)	(9.1)	(13.7)	(18.0)	(22.9)	(5.0)
			4)	7,4	14,2	21,2	28,0	35,5	7,8
				(4.6)	(8.8)	(13.2)	(17.4)	(22.1)	(4.8)
1990	9000T	GM 75402	3)	8,2	15,8	23,6	31,2	39,6	8,7
				(5.1)	(9.8)	(14.7)	(19.4)	(24.6)	(5.4)
			6)	8,4	16,2	24,2	31,9	40,5	8,9
				(5.2)	(10.1)	(15.0)	(19.8)	(25.2)	(5.5)
			4)	8,1	15,6	23,3	30,7	39,0	8,5
				(5.0)	(9.7)	(14.5)	(19.1)	(24.2)	(5.3)
			8)	8,2	15,7	23,4	31.0	39,3	8,6
				(5.1)	(9.8)	(14.5)	(19.3)	(24.4)	(5.3)
1991	9000T	GM 75402	3)	8,2	15,8	23,6	31,2	39,6	8,7
	(B202)			(5.1)	(9.8)	(14.7)	(19.4)	(24.6)	(5.4)
			6)	8,4	16,2	24,2	31,9	40,5	8,9
				(5.2)	(10.1)	(15.0)	19.8)	(25.2)	(5.5)
			4)	8,1	15,6	23,3	30,7	39,0	8,5
				(5.0)	(9.7)	(14.5)	(19.1)	(24.2)	(5.3)
			7)	8,2	15,7	23,4	31,0	39,3	8,6
				(5.1)	(9.8)	(14.5)	(19.3)	(24.4)	(5.3)

1) 185/65 R15H: Dynamic rolling radius 301 mm
2) 195/60: Dynamic rolling radius rullradie 299 mm
3) 195/60 VR15: Dynamic rolling radius 299 mm
4) 205/55 VR15: Dynamic rolling radius 295 mm
5) 195/65 R15H: Dynamic rolling radius 306 mm
6) 195/65 VR15: Dynamic rolling radius 306 mm
7) 205/50 VR16: Dynamic rolling radius 297 mm
8) 205/50 ZR16: Dynamic rolling radius 297 mm
9) 205/60 ZR15: Dynamic rolling radius 306 mm
10) 195/65 TR15: Dynamic rolling radius 306 mm

1991	9000T (B234)	GM 75403	3)	8,2 (5.1)	15,8 (9.8)	23,6 (14.7)	31,2 (19.4)	39,6 (24.6)	8,7 (5.4)
			6)	8,4 (5.2)	16,2 (10.1)	24,2 (15.0)	31,9 19.8)	40,5 (25.2)	8,9 (5.5)
			4)	8,1 (5.0)	15,6 (9.7)	23,3 (14.5)	30,7 (19.1)	39,0 (24.2)	8,5 (5.3)
			7)	8,2 (5.1)	15,7 (9.8)	23,4 (14.5)	31,0 (19.3)	39,3 (24.4)	8,6 (5.3)
1991	9000i	GM 65103	1)	7,5 (4.7)	14,5 (9.0)	21,6 (13.4)	28,5 ((17.7)	36,2 (22.5)	7,9 (4.9)
			5)	7,7 (4.8)	14,7 (9.1)	22,0 (13.7)	29,0 (18.0)	36,8 (22.9)	8,1 (5.0)
			4)	7,4 (4.6)	14,2 (8.8)	21,2 (13.2)	28,0 (17.4)	35,5 (22.1)	7,8 (4.8)
			2)/3)	7,5 (4.7)	14,4 (8.9)	21,5 (13.4)	28,3 (17.6)	36,0 (22.4)	7,9 (4.9)
			7)	7,5 (4.7)	14,3 (8.9)	21,3 (13.2)	28,1 (17.5)	35,7 (22.2)	7,9 (4.9)
1992	9000T (B202)	GM 75402	6)	8,4 (5.2)	16,2 (10.1)	24,2 (15.0)	31,9 (19.8)	40,5 (25.2)	8,9 (5.5)
			9)	8,4 (5.2)	16,2 (10.1)	24,2 (15.0)	31,9 (19.8)	40,5 (25.2)	8,9 (5.5)
			7)	8,2 (5.1)	15,7 (9.8)	23,5 (14.5)	31,0 (19.3)	39,3 (24.4)	8,6 (5.3)
1992	9000T (B234)	GM 75404	6)	8,4 (5.2)	16,2 (10.1)	24,2 (15.0)	31,9 (19.8)	40,5 (25.2)	8,9 (5.5)
			9)	8,4 (5.2)	16,2 (10.1)	24,2 (15.0)	31,9 (19.8)	40,5 (25.2)	8,9 (5.5)
			7)	8,2 (5.1)	15,7 (9.8)	23,5 (14.5)	31,0 (19.3)	39,3 (24.4)	8,6 (5.3)
1992	9000i	GM 65103	10)	7,7 (4.8)	14,7 (9.1)	22,0 (13.7)	29,0 (18.0)	36,8 (22.9)	8,1 (5.0)
			6)	7,7 (4.8)	14,7 (9.1)	22,0 (13.7)	29,0 (18.0)	36,8 (22.9)	8,1 (5.0)
			9)	7,7 (4.8)	14,7 (9.1)	22,0 (13.7)	29,0 (18.0)	36,8 (22.9)	8,1 (5.0)
			8)	7,4 (4.6)	14,2 (8.8)	21,2 (13.2)	28,0 (17.4)	35,5 (22.1)	7,8 (4.8)

1) 185/65 R15H: Dynamic rolling radius 301 mm
2) 195/60 R15H: Dynamic rolling radius 299 mm
3) 195/60 VR15: Dynamic rolling radius 299 mm
4) 205/55 VR15: Dynamic rolling radius 295 mm
5) 195/65 R15H: Dynamic rolling radius 306 mm
6) 195/65 VR15: Dynamic rolling radius 306 mm
7) 205/50 VR16: Dynamic rolling radius 297 mm
8) 205/50 ZR16: Dynamic rolling radius 297 mm
9) 205/60 ZR15: Dynamic rolling radius 306 mm
10) 195/65 TR15: Dynamic rolling radius 306 mm

Automatic transmission

Transmission capacity

		2-stage governor Turbo	3-stage governor Turbo	2-stage governor 9000i/S	3-stage governor 9000i/S	3-stage governor 9000i 2.3	3-stage governor Turbo 2.3
Input torque	Nm	max 270	max 270	max 170	max 170	max 210	max 300
Maximum torque multiplication in torque converter		1:1-1:2.5	1:1-1.2.5	1:1-1:2.57	1:1-1:2.57	1:1-1:2.57	1:1-1:2.57
Torque-converter diameter	mm	260	260	260	260	260	260
Gear ratios:							
1st		2.58	2.58	2.58	2.58	2.58	2.58
2nd		1.41	1.41	1.41	1.41	1.41	1.41
3rd		1.0	1.0	1.0	1.0	1.0	1.0
4th		0.74	0.74	0.74	0.74	0.74	0.78
Reverse		2.88	2.88	2.88	2.88	2.88	2.88

Weight, oil capacities and oil grades

		2-stage governor Turbo	3-stage governor Turbo	2-stage governor 9000i/S	3-stage governor 9000i/S	3-stage governor 9000i 2.3	3-stage governor Turbo 2.3
Weight of transmission excluding torque converter and ATF	kg	Approx. 55.0	Approx. 55.0	Approx. 55.0	Approx. 55.0	Approx. 55.0	Approx. 55.0
Weight of torque converter	kg	Approx. 10.5	Approx. 10.5	Approx. 10.5	Approx. 10.5	Approx. 10.5	Approx. 10.5
ATF capacity (including that in torque converter and oil cooler)	litres	Approx. 8.2	Approx. 8.2	Approx. 8.2	Approx. 8.2	Approx. 8.7	Approx. 8.7
ATF capacity (for oil change)	l	Approx. 4.2	Approx. 4.2	Approx. 4.2	Approx. 4.2	Approx. 4.2	Approx. 4.2
ATF grade		DEXRON II automatic transmission fluid (ATF)					

Shift-up speeds

Minimum throttle and accelerator steady

		2-stage governor Turbo	3-stage governor Turbo	2-stage governor 9000i/S	3-stage governor 9000i/S	3-stage governor 9000i 2.3	3-stage governor 9000S 2.3 US, CA
Upshift to 2nd gear occurs at:	km/h (mph)	26-38 (16-24)	19-25 (12-15)	18-28 (11-17)	18-24 (11-15)	18-24 (12-15)	19-25 (12-15)
Upshift to 3rd gear occurs at:	km/h (mph)	44-56 (27-34)	40-50 (25-31)	38-48 (24-30)	37-47 (23-29)	37-47 23-29)	40-50 (25-31)
Upshift to 4th gear occurs at:	km/h (mph)	65-77 (40-48)	56-73 (34-45)	58-70 (36-44)	53-68 (33-42)	53-68 (33-42)	58-75 (36-46)

Accelerator moved to kick-down position and held there

		2-stage governor Turbo	3-stage governor Turbo	2-stage governor 9000i/S	3-stage governor 9000i/S		
Upshift to 2nd gear occurs at 5,400 ± 300 rpm	km/h (mph)	57-67 (35-42)	56-66 (34-41)	52-62 (32-38)	52-62 (32-38)		
Upshift to 3rd gear occurs at 5,400 ± 300 rpm	km/h (mph)	109-121 (68-75)	108-120 (67-74)	102-112 (63-70)	100-111 (62-69)		
Upshift to 4th gear occurs at 5,400 ± 300 rpm 3-stage governor, M88-90: upshift to 4th gear occurs at 5,100 ± 300 rpm	km/h (mph)	157-169 (98-105)	140-157 (87-97)	139-149 (86-93)	131-147 (81-91)		

Accelerator moved to kick-down position and held there

		3-stage governor 9000i 2.3	3-stage governor 9000S 2.3 US, CA	3-stage governor Turbo 2.3			
Upshift to 2nd gear at 5,400 ± 300 rpm	km/h (mph)	52-62 (32-38)	56-66 (34-41)	58-68 (36-42)			
Upshift to 3rd gear at 5,400 ± 300 rpm	km/h (mph)	100-111 (62-69)	108-120 (67-74)	111-125 (69-78)			
Upshift to 4th gear at 5,400 ± 300 rpm 3-stage governor, M88-90: upshift to 4th gear occurs at 5,100 ± 300 rpm	km/h (mph)	141-159 (87-98)	161-173 (100-107)	160-175 (99-109)			

Accelerator moved to kick-down position at different speeds

		2-stage governor Turbo	3-stage governor Turbo	2-stage governor 9000i/S	3-stage governor 9000i/S	3-stage governor 9000i 2.3	3-stage governor 9000S 2.3 US, CA Turbo 2.3
Maximum downshift speed: 4th-3rd	km/h (mph)	139-151 (86-94)	139-151 (86-94)	125-135 (78-84)	125-135 (78-84)	125-135 (78-84)	142-154 (88-96)
Maximum downshift speed: 3rd-2nd	km/h (mph)	90-102 (56-63)	90-100 (56-62)	82-92 (51-57)	82-92 (51-57)	82-92 (51-57)	92-102 (57-63)
Maximum downshift speed: 3rd-1st	km/h (mph)	55-65 (34-40)	45-55 (28-34)	45-55 (28-34)	40-50 (25-31)	40-50 (25-31)	45-55 (28-34)

Gear ratios

Year	Model	Type designation	Primary drive	Final drive ratio	Overall ratios				
					1	2	3	4	Reverse
1987	9000i	GAT 4102	0.98	4.28	10.64	5.91	4.20	3.12	12.10
	9000T	GAT 4301	0.90	4.28	9.91	5.41	3.84	2.85	11.07
1988	9000i	GA 64101	0.98	4.28	10.64	5.91	4.20	3.12	12.10
	9000T	GA 74301	0.90	4.28	9.91	5.41	3.84	2.85	11.07
1989	9000i	GA 64102	0.98	4.28	10.84	5.91	4.20	3.12	12.10
	9000T	GA 74302	0.90	4.28	9.91	5.41	3.84	2.85	11.07
1990	9000i	GA 64103	0.98	4.28	10.84	5.91	4.20	3.12	12.10
	9000i, 2,3 l	GA 64104	0.98	4.28	10.84	5.91	4.20	3.12	12.10
	9000T	GA 74303	0.90	4.28	9.91	5.41	3.84	2.85	11.07
1991	9000i	GA 64103	0.98	4.28	10.84	5.91	4.20	3.12	12.10
	9000i, 2,3 l not US	GA 64104	0.98	4.28	10.84	5.91	4.20	3.12	12.10
	9000i, 2,3 l US	GA 64301	0.98	4.28	10.84	5.91	4.20	3.12	12.10
	9000T	GA 74303	0.90	4.28	9.91	5.41	3.84	2.85	11.07
1992	9000i	GA 64107	0.98	4.28	10.84	5.91	4.20	3.12	12.10
	9000i, 2,3 l not US	GA 64106	0.98	4.28	10.84	5.91	4.20	3.12	12.10
	9000i, 2,3 l US	GA 64302	0.98	4.28	10.84	5.91	4.20	3.12	12.10
	9000T	GA 74307	0.90	4.28	9.91	5.41	3.84	2.85	11.07
	9000T, 2,3 l	GA 74306	0.90	4.28	9.91	5.41	3.84	2.85	11.07

Road speed

Year	Model	Type designation	Tyre alt.	Road speed at 1000 rpm (km/h)				
				1	2	3	4	Re-verse
1987	9000i	GAT 4102	1)	10,7	19,2	27,0	36,4	9,4
			2)	10,6	19,1	26,8	36,1	9,3
	9000T	GAT 4301	3)	11,4	20,8	29,4	39,6	10,2
			4)	11,2	20,6	29,0	39,0	10,0
1988	9000i	GA 64101	1)	10,7	19,2	27,0	36,4	9,4
			4)	10,5	18,8	26,5	35,6	9,2
	9000T	GA 74301	3)	11,4	20,8	29,4	39,6	10,2
			6)	11,7	21,4	31,1	40,6	10,5
			4)	11,2	20,6	29,0	39,0	10,0
1989	9000i	GA 64102	1)	10,5	19,2	27,0	36,4	9,4
			5) or 6)	10,7	19,5	27,5	37,0	9,5
			4)	10,3	18,8	26,4	35,7	9,2
	9000T	GA 74302	3)	11,4	20,8	29,4	39,6	10,2
			6)	11,6	21,3	30,0	40,5	10,4
			4)	11,2	20,6	29,0	39,0	10,0
1990	9000i	GA 64103	1)	10,5	19,2	27,0	36,4	9,4
			5) or 6)	10,7	19,5	27,5	37,0	9,5
			2) or 3)	10,4	19,1	26,9	36,2	9,3
			4)	10,3	18,8	26,4	35,7	9,5
			7) alt 8)	10,4	18,9	26,7	35,9	9,2
	9000i, 2,3 l	GA 64104	1)	10,5	19,2	27,0	36,4	9,4
			5) or 6)	10,7	19,5	27,5	37,0	9,5
			2) or 3)	10,4	19,1	26,9	36,2	9,3
			4)	10,3	18,8	26,4	35,7	9,5
			7) or 8)	10,4	18,9	26,7	35,9	9,2
	9000T	GA 74303	2) or 3)	11,4	20,8	29,4	39,6	10,2
			5) or 6)	11,6	21,3	30,0	40,5	10,4
			4)	11,2	20,6	29,0	39,0	10,0
			7) or 8)	11,3	20,7	29,1	39,3	10,1

1) 185/65 R15H: Dynamic rolling radius 301 mm
2) 195/60 R15H: Dynamic rolling radius 299 mm
3) 195/60 VR15: Dynamic rolling radius 299 mm
4) 205/55 VR15: Dynamic rolling radius 295 mm
5) 195/65 R15H: Dynamic rolling radius 306 mm
6) 195/65 VR15: Dynamic rolling radius 306 mm
7) 205/50 VR16: Dynamic rolling radius 297 mm
8) 205/50 ZR16: Dynamic rolling radius 297 mm
9) 205/60 ZR15: Dynamic rolling radius 306 mm
10) 195/65 TR15: Dynamic rolling radius 306 mm

Year	Model	Type designation	Tyre alt.	Road speed at 1000 rpm (km/h)				
				1	2	3	4	Re-verse
1991	9000i	GA 64103	1)	10,5	19,2	27,0	36,4	9,4
			5) or 6)	10,7	19,5	27,5	37,0	9,5
			3)	10,4	19,1	26,9	36,2	9,3
			4)	10,3	18,8	26,4	35,7	9,5
			7) or 8)	10,4	18,9	26,7	35,9	9,2
	9000i, 2,3 l not US	GA 64104	1)	10,5	19,2	27,0	36,4	9,4
			5) or 6)	10,7	19,5	27,5	37,0	9,5
			3)	10,4	19,1	26,9	36,2	9,3
			4)	10,3	18,8	26,4	35,7	9,5
			7) or 8)	10,4	18,9	26,7	35,9	9,2
	9000i, 2,3 l US	GA 64301	1)	10,5	19,2	27,0	36,4	9,4
			5) or 6)	10,7	19,5	27,5	37,0	9,5
			3)	10,4	19,1	26,9	36,2	9,3
			4)	10,3	18,8	26,4	35,7	9,5
			7) or 8)	10,4	18,9	26,7	35,9	9,2
	9000T	GA 74303	3)	11,4	20,8	29,4	39,6	10,2
			5) or 6)	11,6	21,3	30,0	40,5	10,4
			4)	11,2	20,6	29,0	39,0	10,0
			7) or 8)	11,3	20,7	29,1	39,3	10,1
1992	9000i	GA 64107	6) or 10)	10,6	19,5	27,5	37,0	9,5
			9)	10,6	19,5	27,5	37,0	9,5
			8)	10,3	18,9	26,7	35,9	9,3
	9000i, 2,3 l not US	GA 64106	6) or 10)	10,6	19,5	27,5	37,0	9,5
			9)	10,6	19,5	27,5	37,0	9,5
			8)	10,3	18,9	26,7	35,9	9,3
	9000i, 2,3 l US	GA 64302	6) or 10)	10,6	19,5	27,5	37,0	9,5
			9)	10,6	19,5	27,5	37,0	9,5
			8)	10,3	18,9	26,7	35,9	9,3
	9000T	GA 74307	6) or 10)	11,6	21,3	30,0	40,5	10,4
			9)	11,6	21,3	30,0	40,5	10,4
			8)	11,3	20,7	29,2	39,3	10,1
	9000T, 2,3 l	GA 74306	6) or 10)	11,6	21,3	30,0	40,5	10,4
			9)	11,6	21,3	30,0	40,5	10,4
			8)	11,3	20,7	29,2	39,3	10,1

1) 185/65 R15H: Dynamic rolling radius 301 mm
2) 195/60 R15H: Dynamic rolling radius 299 mm
3) 195/60 VR15: Dynamic rolling radius 299 mm
4) 205/55 VR15: Dynamic rolling radius 295 mm
5) 195/65 R15H: Dynamic rolling radius 306 mm
6) 195/65 VR15: Dynamic rolling radius 306 mm
7) 205/50 VR16: Dynamic rolling radius 297 mm
8) 205/50 ZR16: Dynamic rolling radius 297 mm
9) 205/60 ZR15: Dynamic rolling radius 306 mm
10) 195/65 TR15: Dynamic rolling radius 306 mm

Setting values: Turbo

Speeds and pressures with transmission at normal temperature		Position R	Position N	Position D	Position 1
Idling speed	rpm	900	875	900	900
Line pressure on idling	bar	11,3 ± 1,0	7,5 ± 0,4	7,5 ± 0,4	7,5 ± 0,4
Line pressure on idling with kick-down cable fully extended	bar	18,0 +3,0/-0	13,0 ± 0,7	13,0 ± 0,7	13,0 ± 0,7
Stalling speed with footbrake applied for maximum of 5 s (basic charging pressure)	rpm			2600-3100	2600-3100
Turbo 2.3: Stalling is not recommended owing to risk of damage to drive shafts and torque converter	rpm			2600-3000	2600-3000

Note

The specified line pressures apply at an ATF temperature of +40 - 50°C (+105 - 120°F).

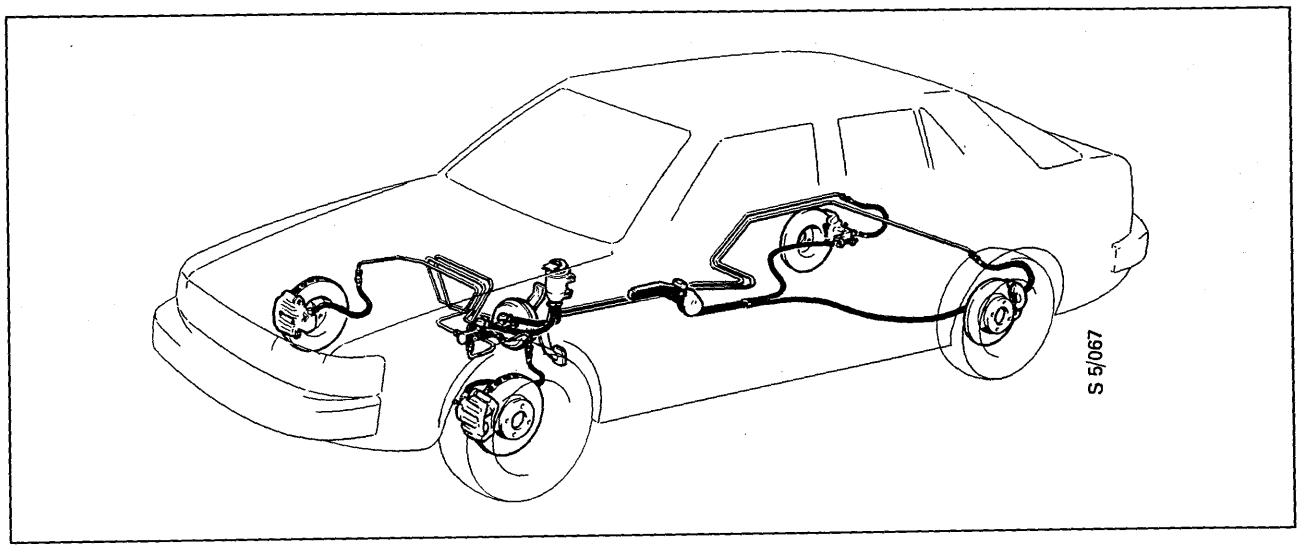
Setting values: 9000i/S

Speeds and pressures with transmission at normal temperature		Position R	Position N	Position D	Position 1
Idling speed	rpm	950	875	950	950
Line pressure on idling	bar	11,3 ± 1,0	7,5 ± 0,4	7,5 ± 0,4	7,5 ± 0,4
Line pressure on idling with kick-down cable fully extended	bar	17,0 +2,0/-1.0	12,3 ± 0,7	12,3 ± 0,7	12,3 ± 0,7
Stalling speed with footbrake applied for maximum of 5 s	rpm			2300-2700	2300-2700
Stalling speed with footbrake applied for maximum of 5 s (9000i 2.3)	rpm			2600-3100	2600-3100

Note

The specified line pressures apply at an ATF temperature of +40 - 50°C (+105 - 120°F).

Brakes



Brake system

Type	Dual diagonally split brake circuits
Footbrake system	Acting hydraulically on all wheels
Handbrake system	Acting mechanically on the rear wheels

Brake fluid reservoir

Capacity	litres	0,24
Capacity of brake system	litres	0,5
Brake fluid specification		DOT 4
Number of chambers:		3
No. 1 chamber		To primary circuit
No. 2 chamber		To secondary circuit
No. 3 chamber		To clutch cylinder

Brake servo unit

Make		Girling
Type		Vacuum assisted
Diameter	mm (in)	203 (8)
Power assistance		4:1 at pedal pressure of 300 N (66 lbf)

Master cylinder

Make		Girling
Type		Tandem cylinder
Diameter	mm (in)	22,2 (0.87)

9000 Turbo (M85–87)

9000i: M85–89

Front-wheel brakes

Make		Girling
Type designation		Colette 54
Type		Disc brake with sliding caliper
Piston diameter	mm (in)	54 (2.13)

Front-wheel discs

(9000 Turbo M85-M86)

Type		Ventilated
Outside diameter	mm (in)	280 (11.03)
Thickness (new disc)	mm (in)	22,5 +0/-0,2 (0.89 +0/-0.01)
Minimum thickness	mm (in)	20,5 (0.81)
Minimum thickness after grinding	mm (in)	21,0 (0.83)
Maximum grinding depth each side	mm (in)	1,0 (0.04)
Maximum runout with disc fitted	mm (in)	0,08 (0.003)
Maximum variation in disc thickness	mm (in)	0,015 (0.0006)

Both sides of the disc must be turned/ground by an equal amount

Front-wheel discs

(9000 Turbo M87, 9000i M85-M89)

Type		Ventilated
Outside diameter	mm (in)	278 (10.95)
Thickness (new disc)	mm (in)	23,5 ± 0,2 (0.87 ± 0.01)
Minimum thickness	mm (in)	21,5 (0.79)
Minimum thickness after grinding	mm (in)	22,0 (0.86)
Maximum grinding depth each side	mm (in)	1,0 (0.04)
Maximum runout with disc fitted	mm (in)	0,08 (0.003)
Maximum variation in disc thickness	mm (in)	0,015 (0.0006)

Both sides of the disc must be turned/ground by an equal amount

Front-wheel pads

Thickness of new lining	mm (in)	16,7 (0.66)
Minimum thickness	mm (in)	4,0 (0.16)
Area of friction material on each pad	cm^2 (in^2)	35 (5.4)

9000 Turbo (M88 onwards)

9000i (M90 onwards)

Front-wheel brakes

Make		ATE
Type designation		FN 57
Type		Disc brake with sliding caliper
Piston diameter	mm (in)	57 (2.44)

Front-wheel discs

Type		Ventilated
Outside diameter	mm (in)	278 (10.95)
Thickness (new disc)	mm (in)	25,0 ± 0,2 (0.98 ± 0.01)
Minimum thickness	mm (in)	23,0 (0.90)
Minimum thickness after grinding	mm (in)	23,5 (0.91)
Maximum grinding depth each side	mm (in)	1,0 (0.04)
Maximum runout with disc fitted	mm (in)	0,08 (0.003)
Maximum variation in disc thickness	mm (in)	0,015 (0.0006)

Both sides of the disc must be turned/ground by an equal amount

Front-wheel pads

Thickness of new lining	mm (in)	19,5 (0.77)
Minimum thickness	mm (in)	4,0 (0.16)
Area of friction material on each pad	cm^2 (in^2)	48 (7.4)

Rear-wheel brakes

Make		ATE
Type		Disc brake with sliding caliper
Piston diameter	mm (in)	33 (1.26)

Rear-wheel discs

Type		Solid (non-ventilated)
Outside diameter	mm (in)	258 (10.16)
Thickness (new disc)	mm (in)	9,0 ± 0,1 (0.35 ± 0.004)
Minimum thickness	mm (in)	7,5 (0.29)
Minimum thickness after grinding	mm (in)	8,0 (0.31)
Maximum grinding depth each side	mm (in)	0,7 (0.03)
Maximum runout with disc fitted	mm (in)	0,08 (0.003)
Maximum variation in disc thickness	mm (in)	0,015 (0.0006)

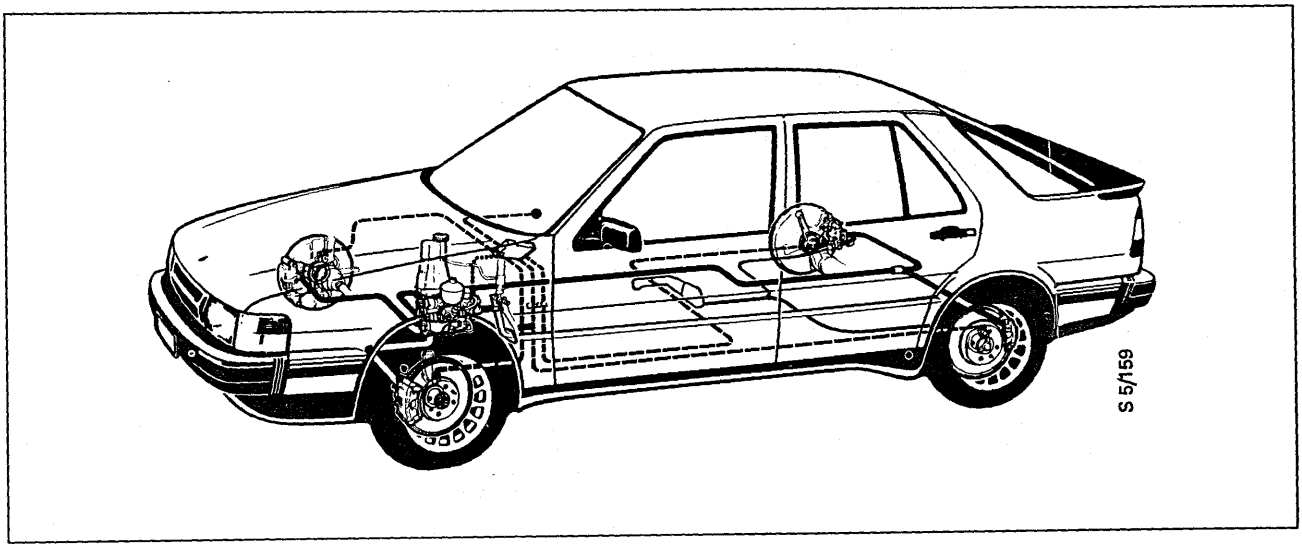
Both sides of the disc must be turned/ground by an equal amount

Rear-wheel pads

Thickness of new lining	mm (in)	11,0 (0.43)
Minimum thickness	mm (in)	4,0 (0.16)
Area of friction material on each pad	cm^2 (in^2)	18,4 (2.8)

Tightening torques

Carrier to steering swivel member	Nm (lbf ft)	70-110 (52-81)
Carrier to rear-wheel hub	Nm (lbf ft)	70-90 (52-67)



ABS brakes

Brake system

Type	Triple-circuit system
Footbrake system	Operates hydraulically on all wheels
Handbrake system	Operates mechanically on the rear wheels

Brake fluid reservoir

Reservoir capacity	litres	0,8
Total capacity of brake system	litres	1,2
Brake fluid specification		DOT 4
Number of chambers		3
No. 1 chamber		Static circuit
No. 2 chamber		Dynamic circuit (to pump)
No. 3 chamber		Dynamic circuit (return from servo)
Flow through filter	litres/min	0,5
Fluid level indicator resistance	ohm	10 (reservoir empty)
ABS-warning switch resistance	ohm	1 (reservoir full)

Hydraulic unit

Make		ATE
Working voltage	V	10-14
Working temperature	°C (°F)	-30 to +80 (-21 to +176)
Brake-circuit pressure	bar (psi)	0-180 (0-2610)

Pump

Type		Ball-valve
Pressure, inlet side	bar (psi)	0,1-1,0 (1.45-14.5)
Pressure, delivery side	bar (psi)	140-180 (2030-2610)
Relief valve opens at:	bar (psi)	210 (3045)
Power demand	W	180 (at 160 bar)
Maximum running time		2 min at a time followed by 10-min pause (pump must not be run dry)

Accumulator

Gas		Nitrogen
Gas pressure at 20°C (68°F)	bar (psi)	80 (1160)
Minimum gas pressure	bar (psi)	40 (580)
Fluid capacity	litres	0,25
Working pressure range	bar (psi)	135-190 (1958-2755)
Maximum pressure drop per 10 min	bar (psi)	10 (145)

Pressure/warning-light switch

Pressure switch: breaks circuit at	bar (psi)	180 ± 4 (2610 ± 58)
Pressure switch: makes circuit at	bar (psi)	140 ± 4 (2030 ± 58)
Warning-light switch: breaks circuit at	bar (psi)	134 ± 2 (1943 ± 29)
Warning-light switch: makes circuit at	bar (psi)	105 ± 2 (1523 ± 29)

Main valve

Maximum working pressure	bar (psi)	180 (2610)
Power rating at 12 V	W	35
Resistance	ohm	4-5 (terminal 1-2)

In-/outlet valves

Maximum working pressure	bar (psi)	180 ± 40 (2610 ± 580)
Power rating at 12 V	W	25
Resistance, inlet valve	Ohm	6-7 (terminals 7-1, 7-3 and 7-6)
outlet valve	Ohm	3-4 (terminals 7-2, 7-4 and 7-5)
Flow capacity at 20°C and 100 bar	cm^3/s	36

ECU

Working voltage range	V	7-18
Power rating	W	40
Working temperature range	°C (°F)	-40 to +80 (-40 to +176)

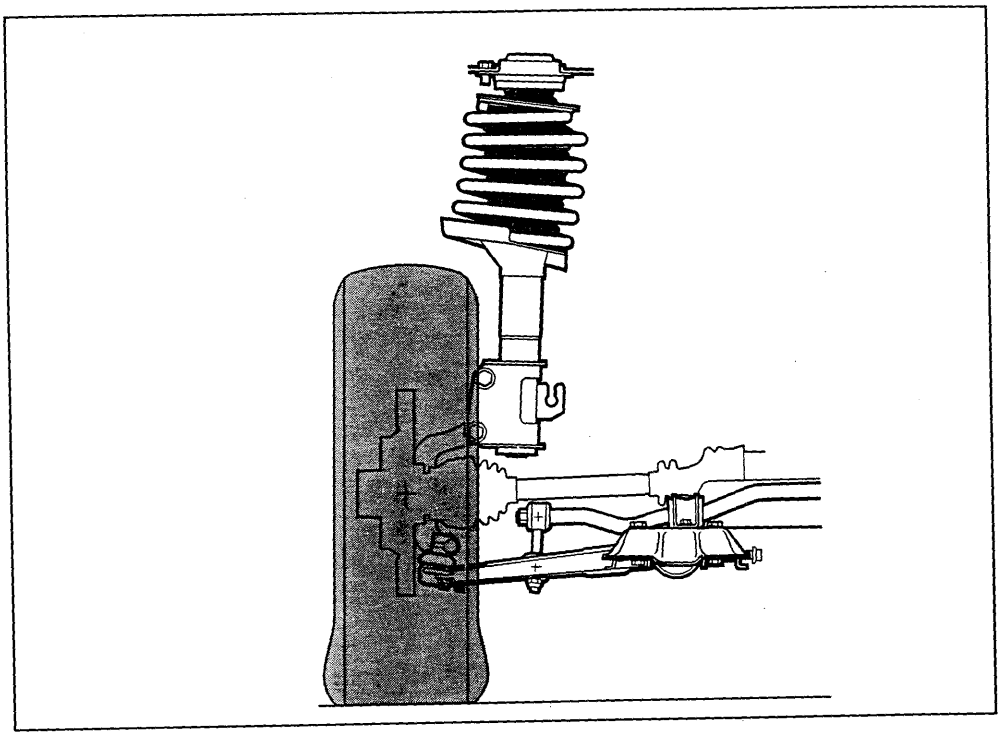
Wheel sensors

Working voltage range	V a.c.	0,15-0,70
Resistance	ohm	800-1400
Number of teeth		94 (Pre-M90) 46 (M90 onwards)
Wheel sensor-sensor wheel clearance	mm (in)	0,65 (0.026)

Tightening torques

Hydraulic unit	Nm (lbf ft)	26 ± 4 (19 ± 3)
Accumulator	Nm (lbf ft)	34-46 (25-34)
Pressure switch	Nm (lbf ft)	20-26 (15-19)

Front assembly and steering



Front assembly

Front-wheel geometry (car unladen)

Toe-in, measured between rims	mm (in)	1,5 ± 0,5(0.06 ± 0.02)
Camber	Degrees	-0,65 ± 0,5
Castor	Degrees	+1,65 ± 0,5
Swivel pin (kingpin) inclination	Degrees	11,3 ± 0,5
Steering angle: outer wheel	Degrees	20
Steering angle: inner wheel	Degrees	21 ± 0,5

Steering

Steering-wheel turns, lock-to-lock	3,2
Damping-yolk adjustment	Screw the damping yolk fully home and then back off through 70–90°. Check that the rack does not bind at any point.
Ball joints (track-rod ends)	Nonadjustable. Must be replaced if play is present.

Track-rod ends

Maximum distance between locknut and groove in track rod	mm (in)	140 (5.51)
Maximum difference in above value between LH and RH track rods	mm (in)	2 (0.08)

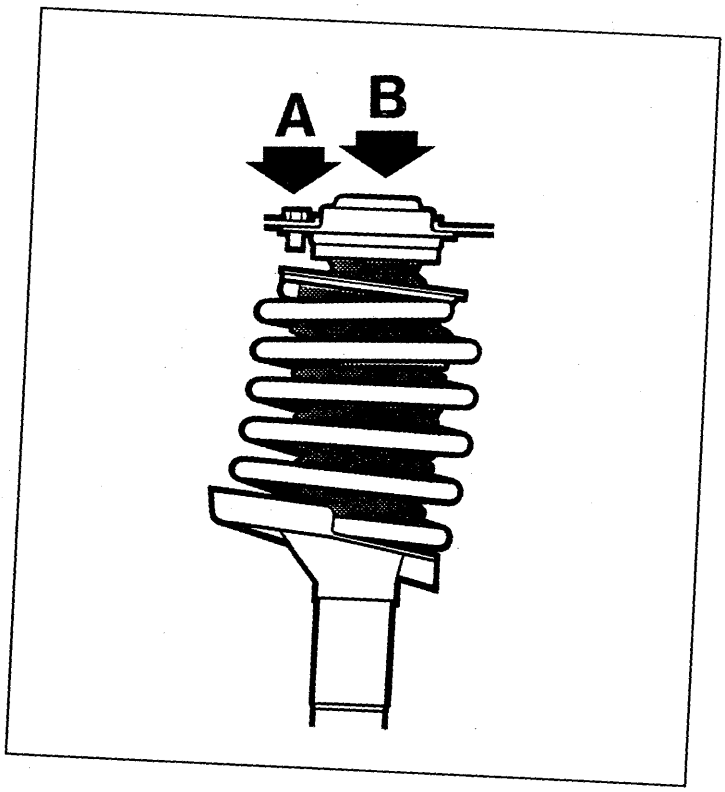
Wear limits

Track-rod end, axial play	mm (in)	2 (0.08)
radial play	mm (in)	1 (0.04)
Inner ball joint, axial play	mm (in)	1 (0.04)

Lubricants

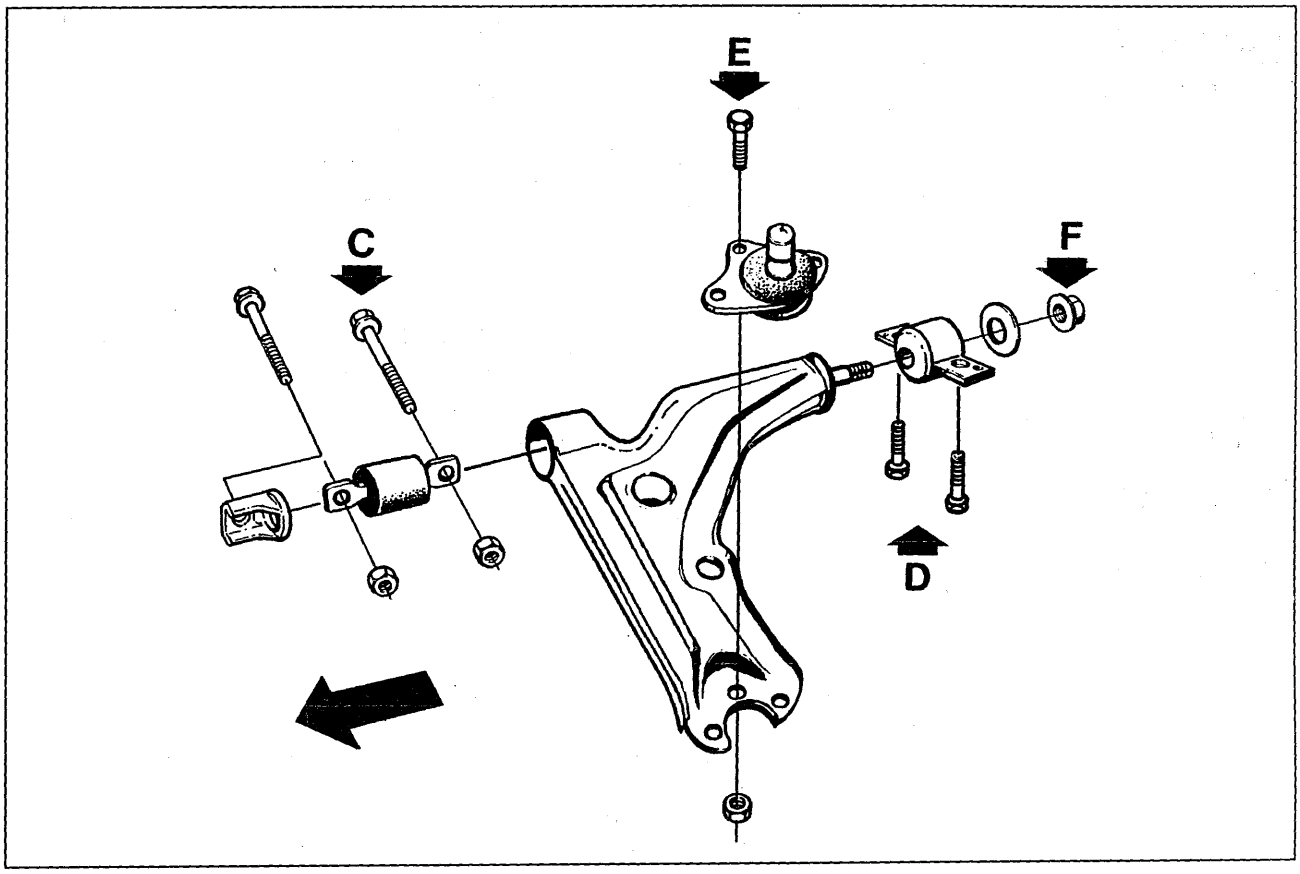
Lubricant type		Lithium grease: Shell EP B2 code 71303, Shell Retinax A or equivalent
Lubricant quantity	g (oz)	60 (2.1) (approx. 7 cl)
Servo fluid		Texaco Power Steering Fluid 4634
Servo fluid quantity	cl (qts)	75 (0.78)

Tightening torques



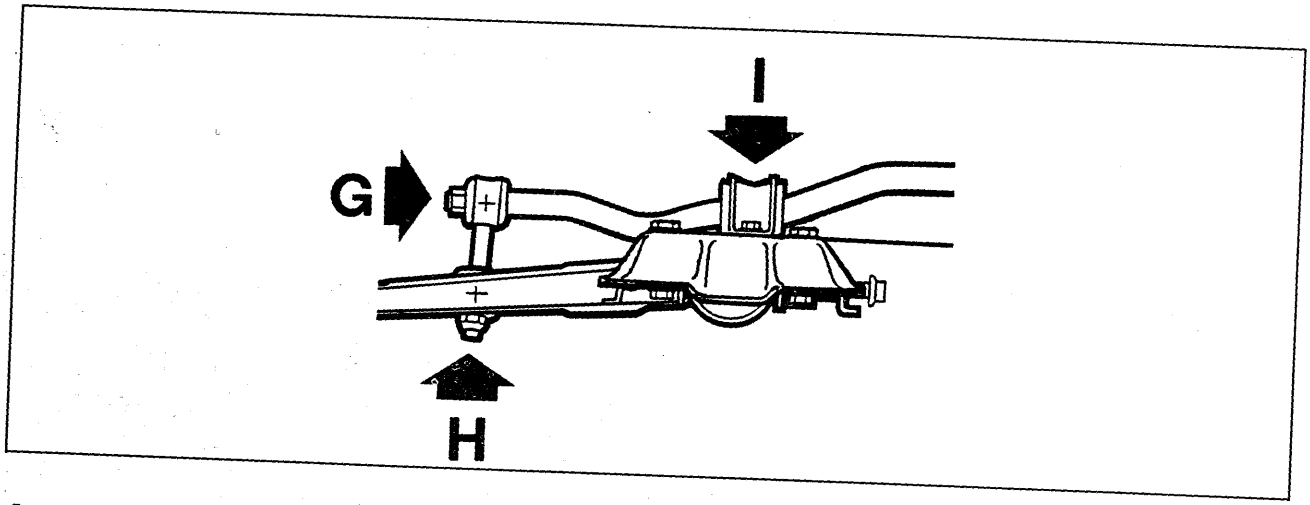
MacPherson strut

A MacPherson strut to body	Nm (lbf ft)	40-54 (30-40)
B MacPherson strut: nut on top mounting	Nm (lbf ft)	68-82 (50-61)



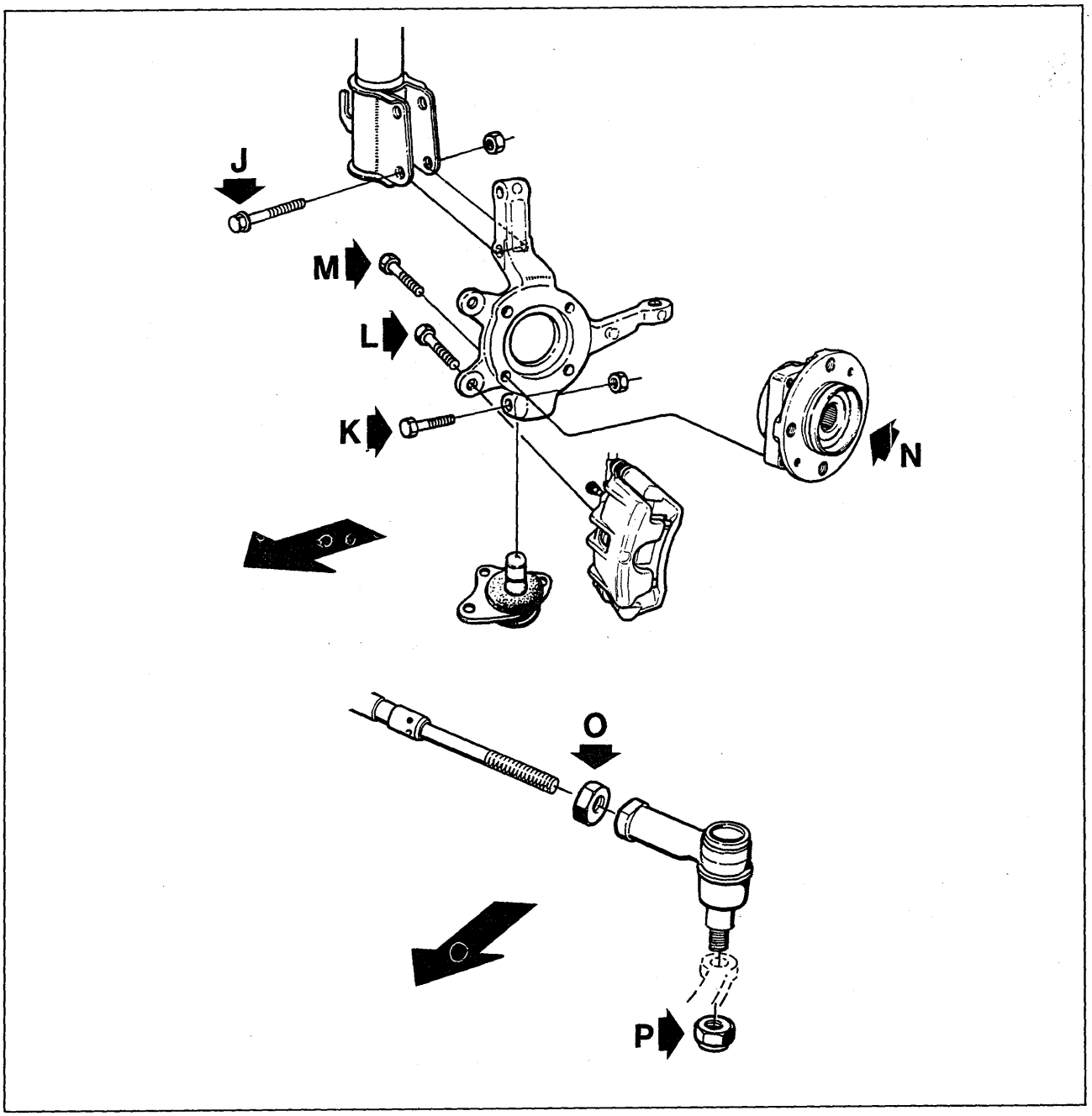
Suspension arms

C Suspension arm front mounting to subframe	Nm (lbf ft)	45-54 (33-40)
D Suspension arm rear mounting to subframe	Nm (lbf ft)	45-54 (33-40)
E Ball joint to suspension arm	Nm (lbf ft)	25-34 (18-25)
F Suspension arm rear mounting	Nm (lbf ft)	60-70 (44-52) (car on the ground)



Anti-roll bar

G Link arm to anti-roll bar	Nm (lbf ft)	25-34 (18-25)
H Link arm to suspension arm	Nm (lbf ft)	20-27 (15-20)
I U-clamp bolts	Nm (lbf ft)	18-29 (13-21)



Steering-swivel member

J Steering-swivel member to MacPherson strut:		
Dry joint	Nm (lbf ft)	78-105 (58-77)
Lubricated joint (waxed nut)	Nm (lbf ft)	55-75 (41-55)
K Bolt securing suspension-arm ball joint to steering-swivel member	Nm (lbf ft)	50-68 (37-50)
L Brake caliper to steering-swivel member	Nm (lbf ft)	60-100 (44-74)
M Hub to steering swivel member	Nm (lbf ft)	50-60 (37-44)
N Hub centre-nut	Nm (lbf ft)	280-300 (207-221)
O Track-rod end locknut	Nm (lbf ft)	60-80 (44-59)
P Track-rod end to steering-swivel member	Nm (lbf ft)	50-60 (37-44)

Suspension and wheels

Suspension

To ensure that the car is the same height on both sides, springs on the same axle must have the same colour coding.

Front coil springs

		Standard chassis	
Total number of turns		6 1/2	6 1/2
Number of active turns		5 1/2	5 1/2
Wire diameter	mm (in)	12,75 (0.502)	12,86 (0.506)
Free length	mm (in)	455 (17.9)	455 (17.9)
Colour coding: Class 1 Class 2		Light blue Beige	Brown Violet

		Standard chassis	
Total number of turns		6 1/2	6 1/2
Number of active turns		5 1/2	5 1/2
Wire diameter	mm (in)	12,97 (0.511)	13,09 (0.515)
Free length	mm (in)	455 (17.9)	455 (17.9)
Colour coding: Class 1 Class 2		Orange Pink	Black White

		Standard chassis
Total number of turns		6 1/2
Number of active turns		5 1/2
Wire diameter	mm (in)	13,20 (0.520)
Free length	mm (in)	455 (17.9)
Colour coding: Class 1 Class 2		Green Grey

		Special chassis	Sports chassis
Total number of turns		6 1/2	6 1/2
Number of active turns		5 1/2	5 1/2
Wire diameter	mm (in)	13,32 (0.524)	14,26 (0.561)
Free length	mm (in)	455 (17.9)	369 (14.5)
Colour coding: Class 1 Class 2		Red Yellow	Silver Bronze

To ensure that the car is the same height on both sides, springs on the same axle must have the same colour coding.

Rear coil springs

		Standard chassis	
Total number of turns		9 1/2	9 1/2
Number of active turns		8	8
Wire diameter	mm (in)	13,4 (0.53)	13,6 (0.54)
Free length	mm (in)	321 (12.6)	321 (12.6)
Colour coding: Class 1		Brown	Orange
Class 2		Dark blue	White

		Standard chassis	
Total number of turns		9 1/2	9 1/2
Number of active turns		8	8
Wire diameter	mm (in)	13,4 (0.53)	13,8 (0.55)
Free length	mm (in)	326 (12.8)	326 (12.8)
Colour coding: Class 1		Light green	Grey
Class 2		Pink	Black

		Nivomat (accessory)	Nivomat (factory fitted)
Total number of turns		9 1/2	9 1/2
Number of active turns		8	8
Wire diameter	mm (in)	12,0 (0.47)	12,3 (0.48)
Free length	mm (in)	328 (12.9)	333 (13.1)
Colour coding: Class 1		Light blue	Green
Class 2		Beige	Violet

		Special chassis	Sports chassis
Total number of turns		9 1/2	9 1/2
Number of active turns		8	8
Wire diameter	mm (in)	13,8 (0.54)	14,0 (0.55)
Free length	mm (in)	322 (12.7)	317 (12.5)
Colour coding: Class 1		Red	Silver
Class 2		Yellow	Bronze

Wheels

Maximum out-of-round (radial runout)	mm (in)	0,5 (0.02)
Maximum runout	mm (in)	0,5 (0.02)

Rear-wheel geometry (car unladen)

Toe-in	mm (in)	2,5 ± 1,5 (0.1 ± 0.06)
Camber	Degrees	-1/4 ± 1/4

Recommended tyre pressures (cold tyres)

SE, FI and EU specs., M85-89
AU, ME and FE specs., M85-90

Tyre size	No. of occupants	Max cruising speed	Front		Rear	
		km/h	bar	(psi)	bar	(psi)
185/65 R15 87T	1-3	0-190	2,2	(32)	2,2	(32)
	4-5		2,6	(38)	2,6	(38)
185/65 R15 87H	1-3	0-210	2,1	(30)	2,1	(30)
	4-5		2,4	(35)	2,4	(35)
195/60 R15 86H	1-3	0-210	2,2	(32)	2,2	(32)
	4-5		2,6	(38)	2,6	(38)
195/60 VR15 (n/a DE spec.)	1-3	0-210	2,2	(32)	2,2	(32)
	1-3	>210	2,6	(38)	2,6	(38)
	4-5		2,6	(38)	2,6	(38)
195/65 R15 91H/V	1-3	0-210	1,9	(28)	1,9	(28)
	1-3	>210	2,2	(32)	2,2	(32)
	4-5		2,2	(32)	2,2	(32)
205/55 VR15 (n/a DE spec.)	1-3	0-210	2,1	(30)	2,1	(30)
	1-3	>210	2,5	(36)	2,5	(36)
	4-5		2,5	(36)	2,5	(36)
Winter tyres						
175/70 R15	1-3		2,3	(33)	2,3	(33)
	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 wheel						
T105/80R16 T115/70 R15/D15 T115/70 R16			4,2	(60)	4,2	(60)
175/70 R15 86T			2,6	(38)	2,6	(38)
Option						
205/50 VR16 (n/a DE spec.)	1-3	0-210	2,1	(30)	2,1	(30)
	1-3	>210	2,5	(36)	2,5	(36)
	4-5		2,5	(36)	2,5	(36)

DE spec., M85-89

Tyre size	Loading class (L)	Front		Rear	
		bar	(psi)	bar	(psi)
195/60 VR15	L1	2,2	(32)	2,2	(32)
	L2	2,4	(35)	2,4	(35)
	L3	2,8	(41)	2,8	(41)
205/55 VR15	L1	2,2	(32)	2,2	(32)
	L2	2,5	(36)	2,5	(36)
	L3	2,9	(42)	2,9	(42)
205/50 VR16	L1	2,3	(33)	2,3	(33)
	L2	2,6	(38)	2,6	(38)
	L3	3,0	(43)	3,0	(43)

SE, FI, EU and GB specs., M90

Tyre size	Loading class (L)	Front		Rear	
		bar	(psi)	bar	(psi)
185/65 R15 87H	L1	2,1	(30)	2,1	(30)
	L2	2,4	(35)	2,4	(35)
	L4	2,6	(38)	2,6	(38)
195/60 VR15	L1	2,3	(33)	2,3	(33)
195/60 R15 87V	L2	2,5	(36)	2,5	(36)
195/60 R15 88V	L3	2,9	(42)	2,9	(42)
195/65 R15 91V	L1	1,9	(28)	1,9	(28)
	L2	2,2	(32)	2,2	(32)
	L3	2,6	(38)	2,6	(38)
195/65 R15 91H	L1	1,9	(28)	1,9	(28)
	L2	2,2	(32)	2,2	(32)
	L4	2,3	(33)	2,3	(33)
205/55 VR15	L1	2,3	(33)	2,3	(33)
205/55 R15 87V	L2	2,6	(38)	2,6	(38)
205/55 R15 88V	L3	3,0	(43)	3,0	(43)
205/50 ZR16	L1	2,4	(35)	2,4	(35)
	L2	2,5	(36)	2,5	(36)
	L3	2,9	(42)	2,9	(42)
Winter tyres					
185/65 R15 87T M+S	L1	2,3	(33)	2,3	(33)
	L2	2,4	(35)	2,4	(35)
	L5	2,6	(38)	2,6	(38)
195/65 R15 91T M+S	L1	2,1	(30)	2,1	(30)
	L2	2,3	(33)	2,3	(33)
	L5	2,3	(33)	2,3	(33)
205/50 R16 86H M+S	L1	2,3	(33)	2,3	(33)
	L2	2,4	(35)	2,4	(35)
	L4	2,9	(42)	2,9	(42)
Spare wheel					
T115/70 R16		4,2	(60)	4,2	(60)

L1	Max 3 occupants	0-160 km/h	All ratings
L2	Max load	0-160 km/h	All ratings
L3	Max load	160 km/h to max speed	V, Z ratings
L4	Max load	160-210 km/h	H rating
L5	Max load	160-190 km/h	T rating

Vehicle-loading classes L3°L5 apply to prolonged cruising at top speed with the car fully laden (in countries with no speed limit). Reduce the pressure by 0.1 bar for each reduction in the number of occupants.

Maximum load = 5 occupants and maximum load in luggage compartment.

US, CA, AU, ME, FE
JP specs. (M86-90)

Tyre size	No. of occupants	Max cruising speed	Front	Rear
		km/h	bar	bar
185/65 R15 87T	1-3	0-190	2,2	2,2
	4-5		2,6	2,6
195/65 R15 91T	1-3	0-190	1,9	1,9
	4-5		2,2	2,2
185/65 R15 87H	1-3	0-210	2,1	2,1
	4-5		2,4	2,4
195/65 R15 91H	1-3	0-210	1,9	1,9
	4-5		2,2	2,2
195/65 VR15, R15 91V	1-3	0-210	1,9	1,9
	1-3	>210	2,2	2,2
	4-5		2,2	2,2
195/60 R15 86/87H	1-3	0-210	2,2	2,2
	4-5		2,6	2,6
195/60 VR15, R15 87/88V	1-3	0-210	2,2	2,2
	1-3	>210	2,6	2,6
	4-5		2,6	2,6
205/55 VR15, R15 87/88V	1-3	0-210	2,1	2,1
	1-3	>210	2,5	2,5
	1-3		2,5	2,5
205/50 VR16, ZR16	1-3	0-210	2,1	2,1
	1-3	>210	2,5	2,5
	4-5		2,5	2,5
175/70 R15 (Winter tyre)	1-3		2,3	2,3
	4-5		2,4	2,4
185/65 R15 (Winter tyre)	1-3		2,2	2,2
	4-5		2,4	2,4
Other tyre sizes				
205/60 R15 90V	1-3	0-210	2,0	2,0
	1-3	>210	2,4	2,4
	4-5		2,4	2,4
205/55 R16 89V	1-3	0-210	2,0	2,0
	1-3	>210	2,4	2,4
	4-5		2,4	2,4

All specifications, M91

Tyre size	Loading class (L)	Front		Rear	
		bar	(psi)	bar	(psi)
185/65 R15 87H	L1	2,1	(30)	2,1	(30)
	L2	2,4	(35)	2,4	(35)
	L4	2,6	(38)	2,6	(38)
195/60 VR15	L1	2,3	(33)	2,3	(33)
195/60 R15 87V	L2	2,5	(36)	2,5	(36)
195/60 R15 88V	L3	2,9	(42)	2,9	(42)
195/65 R15 91V	L1	1,9	(28)	1,9	(28)
	L2	2,2	(32)	2,2	(32)
	L3	2,7	(39)	2,7	(39)
195/65 R15 91H	L1	1,9	(28)	1,9	(28)
	L2	2,2	(32)	2,2	(32)
	L4	2,3	(33)	2,3	(33)
205/55 VR15 (n/a T-16, EU)	L1	2,3	(33)	2,3	(33)
205/55 R15 87V (n/a T-16, EU)	L2	2,6	(38)	2,6	(38)
205/55 R15 88V (n/a T-16, EU)	L3	3,0	(43)	3,0	(43)
205/50 ZR16	L1	2,4	(35)	2,4	(35)
	L2	2,5	(36)	2,5	(36)
	L3	2,9	(42)	2,9	(42)
Winter tyres					
185/65 R15 87T M+S	L1	2,3	(33)	2,3	(33)
	L2	2,4	(35)	2,4	(35)
	L5	2,6	(38)	2,6	(38)
195/65 R15 91T M+S	L1	2,1	(30)	2,1	(30)
	L2	2,3	(33)	2,3	(33)
	L5	2,3	(33)	2,3	(33)
205/50 R16 86H M+S	L1	2,3	(33)	2,3	(33)
	L2	2,4	(35)	2,4	(35)
	L4	2,9	(42)	2,9	(42)
Spare wheel					
T115/70 R16		4,2	(60)	4,2	(60)
175/70 R15 86T (cars with Traction Control System)		2,6	(38)	2,6	(38)

L1	Max 3 occupants	0-160 km/h	All ratings
L2	Max load	0-160 km/h	All ratings
L3	Max load	160 km/h to max speed	V, Z ratings
L4	Max load	160-210 km/h	H rating
L5	Max load	160-190 km/h	T rating

Vehicle-loading classes L3 - L5 apply to prolonged cruising at top speed with the car fully laden (in countries with no speed limit). Reduce the pressure by 0.1 bar for each reduction in the number of occupants.

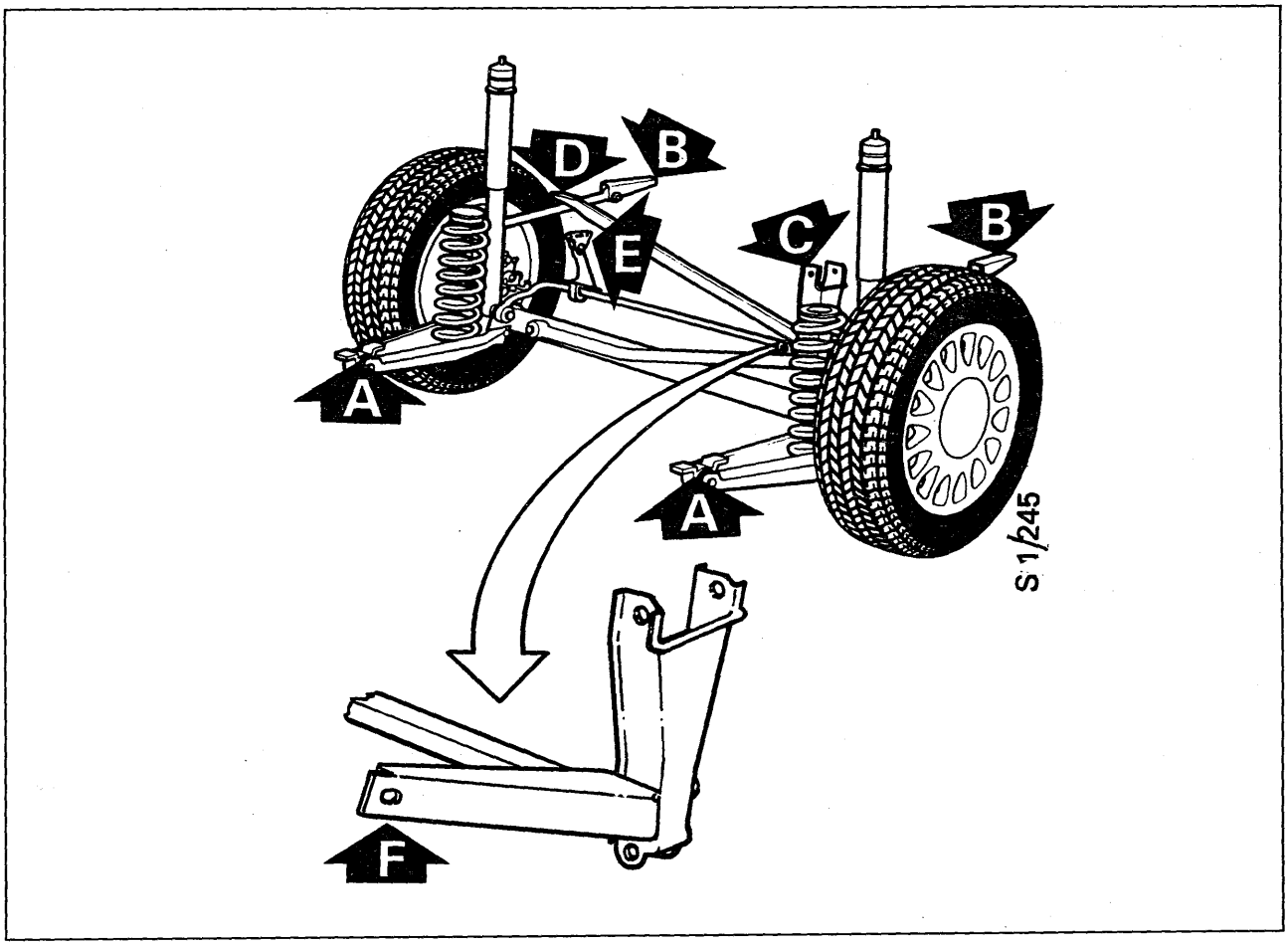
Maximum load = 5 occupants and maximum load in luggage compartment.

All specifications, M92-

Tyre size	Load/speed (km/h)	Front		Rear	
		bar	(psi)	bar	(psi)
195/65 R15T	1-3 pers./0-160	2,1	(30)	2,1	(30)
	Max load/0-160	2,1	(30)	2,1	(30)
	Max load/160-210	2,3	(33)	2,3	(33)
195/65 VR15	1-3 pers./0-160	2,1	(30)	2,1	(30)
	Max load/0-160	2,1	(30)	2,1	(30)
	Max load/160-	2,6	(38)	2,6	(38)
205/60 ZR15	1-3 pers./0-160	2,2	(32)	2,2	(32)
	Max load/0-160	2,2	(32)	2,2	(32)
	Max load/160-	2,7	(39)	2,7	(39)
205/50 ZR16	1-3 pers./0-160	2,4	(35)	2,4	(35)
	Max load/0-160	2,6	(38)	2,6	(38)
	Max load/160-	3,0	(43)	3,0	(43)
Winter tyres					
185/65 R15T M+S	1-3 pers./0-160	2,3	(33)	2,3	(33)
	Max load/0-160	2,5	(36)	2,5	(36)
	Max load/160-	2,7	(39)	2,7	(39)
195/65 R15T M+S	1-3 pers./0-160	2,3	(33)	2,3	(33)
	Max load/0-160	2,5	(36)	2,5	(36)
	Max load/0-190	2,7	(39)	2,7	(39)
205/50 R16H M+S	1-3 pers./0-160	2,3	(33)	2,3	(33)
	Max load/0-160	2,5	(36)	2,5	(36)
	Max load/160-210	2,9	(42)	2,9	(42)
Spare wheel					
115/70 R16	Max 80	4,2	(60)	4,2	(60)
175/70 R15T	Max 80	2,5	(36)	2,5	(36)

Reduce the pressure by 0.1 bar for each reduction in the number of occupants.

Maximum load = 5 occupants and maximum load in luggage compartment.



Tightening torques

Rear suspension

A Spring link to body	Nm (lbf ft)	40-64 (30-47)
B Torque arm to body	Nm (lbf ft)	20-27 (15-20)
C Panhard rod bracket to body	Nm (lbf ft)	40-54 (30-40)
D Upper Panhard rod to body: Dry joint Lubricated joint (waxed nut)	 Nm (lbf ft) Nm (lbf ft)	 84-96 (62-71) 30-70 (22-52)
E Anti-roll bar link arm to body	Nm (lbf ft)	20-27 (15-20)
F Support arm for Panhard rod bracket	Nm (lbf ft)	10-26 (7-19)

Wheel bolts	Nm (lbf ft)	105-125 (76-90)
Hub centre-nut	Nm (lbf ft)	280-300 (205-222)

Body

Paint

Colour code	Colour	Paint type	Remarks
117	Platinum blue	Base	Pre-M87
120	Cochineal red	Base	Pre-M87
127	Cherry red	Solid	Pre-M88
129	Rose quartz	Base	Pre-M87
131	Navy blue	Solid	
153	Cirrus white	Solid	
156	Mother of pearl	Base	Polychromatic primer plus enamel
158	Odoardo grey	Base	Pre-M87
159	Malachite green	Base	Pre-M87
170	Black	Solid	
172	Silver	Base	Pre-M87
198	Embassy blue	Solid	
199*	Test paint	Solid or base	
200	Silver	Base	M87 onwards
201	Bronze	Base	
202	Rose quartz	Base	M87 onwards
203	Platinum blue	Base	M87 onwards
204	Odoardo grey	Base	M87–90
205	Malachite green	Base	M87 onwards
206	Cochineal red	Base	M87 onwards
212	Magenta	Base	
213	Rhodonite	Solid	
214	Cherry red	Solid	M88 onwards
215	Ultramarine	Solid	
216	Beryllium green	Base	Pre-M91
217	Ascot grey	Solid	
219	Talladega red	Solid	
220	Iridium blue	Base	
223	Odoardo grey	Base	M91 onwards
226	Beryllium green	Base	M91 only
227	Citrine beige	Base	
228	Platan grey	Base	
229	Le Mans blue	Base	
230	Scarab green	Base	
232	Derby grey	Solid	M92 onwards
233	Carrara white	Solid	M92 onwards
234	Nocturne blue	Base	M92 onwards
235	Eucalyptus green	Base	M92 onwards

*) Indicates that this is not a stock item but is available to special order only.

Note
Always quote the colour code when ordering paint.

Air conditioning AC (refrigerant R12)

Compressor

Type designation		Sanden SD 510	Sanden SD 709
Number of cylinders		5	7
Swept volume	cm^3	161	154,9
Refrigerant		R12	R12
Oil capacity, new compressor	dl	1,35	1,35
Clutch		Electromagnetic	Electromagnetic
Speed range	r/min	500-6000	500-6000
Weight including clutch	kg (lb)	7,7 (16.8)	6,95 (15.3)

Expansion valve

Type		Thermostatic expansion valve with external equalization
Capacity	ton kW	2 (24000 BTU/hr) 7,2
Superheating	°C (°F)	4,4 ± 0,8 (40 ± 2)

Anti-frost thermostat

Make		Ranco
Breaks circuit at:	°C (°F)	+2,0 ± 1,1 (35.6 ± 1.1)
Makes circuit at:	°C (°F)	5,0 (41.0) (Breaking temperature + maximum difference = 3.6)

Pressure switch (M85)

Breaks circuit at:	bar (psi)	2,7 (39.5)
Makes circuit at:	bar (psi)	3,1 (45)

Three-stage pressure switch (M86 onwards)

		Stage 1	Stage 2	Stage 3
Breaks circuit at:	bar (psi)	1,95 ± 0,24 (28 ± 3.5)	10,7 ± 0,97 (155 ± 14)	26,5 ± 1,95 (380 ± 28)
Makes circuit at:	bar (psi)	2,1 ± 0,34 (30.5 ± 4.95)	14,5 ± 0,97 (210 ± 14)	20,3 ± 1,95 (295 ± 28)

Safety valve

Type		Mechanical
Opens at:	bar (psi)	31 ± 2 (445 ± 29)
Closes at:	bar (psi)	28 (405)

Refrigerant

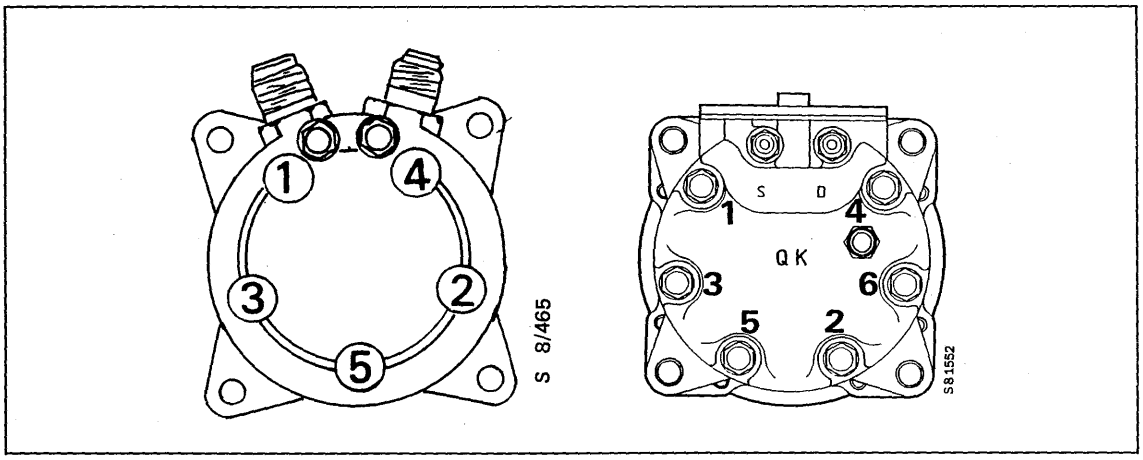
Type		R12
Quantity	kg (lb)	1,1 (2.43)

Refrigeration oil

Viscosity	520 SUS 38 °C (100 °F)
Alternative makes	Suniso 5GS, Texaco Capella E (WF 100), BP energol LPT 100

Tightening torques: screwed connections

Compressor, pressure side	Nm (lbf ft)	30-35 (22-26)
suction side	Nm (lbf ft)	35-40 (26-29.5)
Condenser, inlet side	Nm (lbf ft)	21-28 (15.5-20.5)
outlet side	Nm (lbf ft)	14-20 (10.3-14.7)
Receiver, inlet side	Nm (lbf ft)	14-20 (10.3-14.7)
expansion valve	Nm (lbf ft)	14-20 (10.3-14.7)
Pressure switch on receiver	Nm (lbf ft)	14-20 (10.3-14.7)
Expansion valve, evaporator	Nm (lbf ft)	20-27 (14.7-19.9)
Capillary tube connection to inlet pipe	Nm (lbf ft)	7-10 (5.2-7.3)
Evaporator outlet	Nm (lbf ft)	29-38 (21-28)
Safety valve at condenser outlet	Nm (lbf ft)	14-20 (10.3-14.7)
Safety valve on compressor	Nm (lbf ft)	12-14 (8.8-10.3)



Tightening sequence for head bolts. Torque: 30-34 Nm (22-25 lbf ft)

Tightening torques: Compressors SD 510 and SD 709

Clutch centre-nut	Nm (lbf ft)	34-42 (25-31)
Cylinder head bolts	Nm (lbf ft)	30-34 (22-25)
Oil filler plug	Nm (lbf ft)	8-12 (5.9-8.8)
Service valves	Nm (lbf ft)	12-17 (8.8-12.5)
PAD connection	Nm (lbf ft)	34-40 (25.1-29.5)

Belt-tensioning values

(Using IPU tensiometer)

New (unused) belt:535 ± 45 N (120 ± 10 lbf)

On checking: If the belt tension is below 265 N (60 lbf) we recommend tightening the belt to 355 ± 22 N (80 ± 5 lbf).

Refitting a used belt:
Tension the belt to 355 ± 22 N (80 ± 5 lbf)

Air conditioning AC (refrigerant R134a)

Quantity in the AC system	grammes (lb)	950 (2.1)

Compressor

Type designation		Seiko-Seiki SS121 DN1
Type		Vane type
Swept volume	cm^3 (in^3)	121 (7.4)
Refrigerant		R134a
Oil capacity, new compressor	ml (qts)	200 (0.2)
Clutch		Electromagnetic
Speed	rev/min	500-6000
Weight, incl. clutch	kg (lb)	6,8 (15.0)
Temperature switch		
Break temperature	°C (°F)	140 (284)
Make temperature	°C (°F)	120 (248)

Compressor oil

Type		P.A.G.-oil (Poly alkylene glycol). Synthetic oil of glycol type
Part no.		40 74 787

Expansion valve

Type		Thermostatic expansion valve with internal pressure equalization
Capacity	ton (lb) kW	1,7 (3750) 7,2
Static overheating	°C (°F)	4,4 ± 0,8 (40 ± 2)

Anti-frost thermostat

Manufacturer		Ranco or General Electrics
Break temperature	°C (°F)	+2,0 ± 1,1 (36 ± 2)
Make temperature	°C (°F)	Break temperature + 3,0 ± 1,1 (+4 ± 2)

Safety valve

Type		Mechanical
Opening pressure	bar (psi)	37,0 ± 3,7 (537 ± 54)
Closing pressure	bar (psi)	30 (435)

Three-stage pressure monitor

		First stage	Second stage	Third stage
Break pressure	bar (psi)	2,0 ± 0,25 (29 ± 3.6)	12,5 ± 1,5 (181 ± 28)	30 ± 2,0 (435 ± 29)
Make pressure	bar (psi)	2,15 ± 0,35 (31 ± 5.1)	16,5 ± 1,2 (239 ± 17)	24,0 ± 2,0 (348 ± 29)

Tightening torques

Compressor retaining bolts	Nm (lbf ft)	20-25 (14.8-18.5)
AC hoses on compressor	Nm (lbf ft)	8-12 (5.9-8.9)
Condenser, hose from compressor	Nm (lbf ft)	21-28 (15.5-20.6)
Condenser, hose to drying agent container	Nm (lbf ft)	14-20 (10.3-14.8)
Drying agent container, pipe from condenser	Nm (lbf ft)	18-25 (13.3-18.5)
Drying agent container, pipe to evaporator	Nm (lbf ft)	18-25 (13.3-18.5)
Safety valve	Nm (lbf ft)	11-13 (8.1-9.6)
AC pipe PAD connection to expansion valve	Nm (lbf ft)	4-8 (3.0-5.9)
Expansion valve to evaporator	Nm (lbf ft)	4-8 (3.0-5.9)
Pressure monitors	Nm (lbf ft)	14-20 (10.3-14.8)

Workshop Information

User feedback

To

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Workshop Information, MLSVI
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SWEDEN

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From

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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.

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