

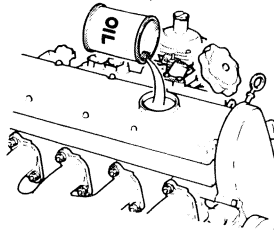
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Section 1 Service and maintenance

Group 16 Lubrication

Engine



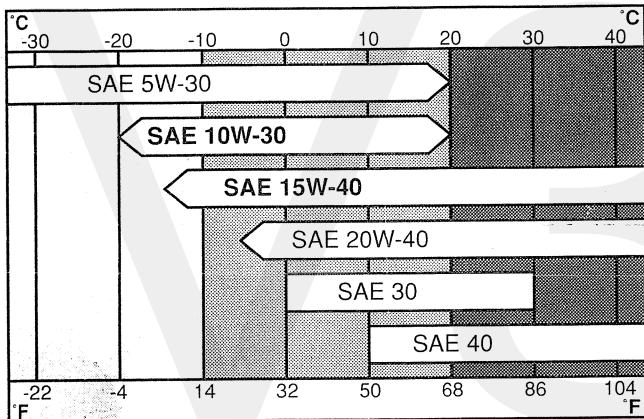
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Engine oil, type and quality (for **petrol** engines)
(for **diesel** engines)

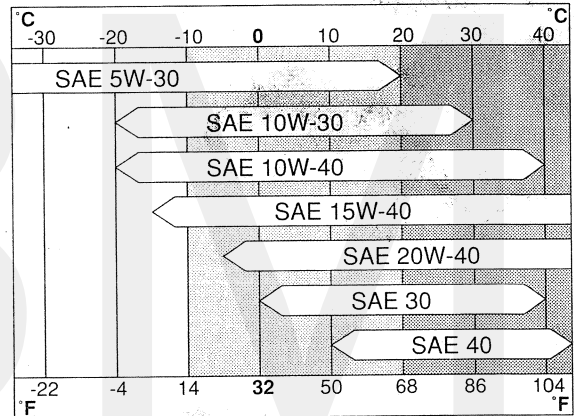
CCMC Service classification: G2 or G3
API Service classification: SF.
API Service classification, minimum CD (oils designated SE/CD, SF/CD, SC/CD and SD/CD comply with this standard).
CCMC Service classification, class D2/PD1

Viscosity Temperature range (stable ambient temperature)

Diesel



Petrol



Under extreme driving conditions which can result in an abnormally high oil temperature and higher oil consumption, such as when driving in mountainous areas with frequent braking on the engine and in the case of high-speed driving on motorways, SAE 15W/40 or SAE 20W/40 oil is recommended, but always bear in mind the lowest temperature limit.

Capacities	Excl. oil filter	Incl. oil filter	Difference between max. - min.
B14/B15	3.5	4.0	1.0
D16	4.5	5.0	1.5
B172K	4.5	5.0	1.5
B19, B200	4.0	4.5	1.0

Carburettor

Oil for damping cylinder (B19A only) ATF

Manual transmission

Gearbox

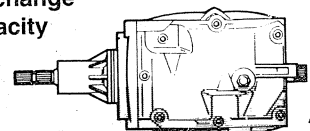
Lubricating oil, type

ATF, type A, suffix A

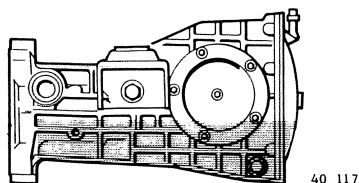
Capacity

Oil change capacity

M45R, up to 1984	litre	2.1	1.9
from 1984	litre	2.35	2.15
M47R, rear filling plug	litre	2.7	2.5
front filling plug up to '85	litre	3.5	3.3
front filling plug from '85	litre	3.0	2.8



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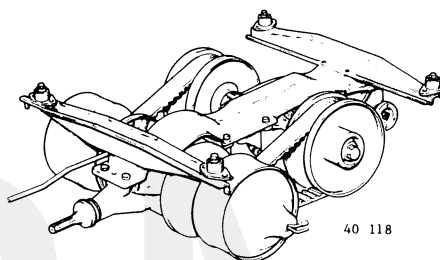
Final drive

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Lubricating oil, type
 quality
 viscosity

Transmission fluid
 API-GL-5 or MIL-L-2105 B or C
 SAE 90

Capacity:
 B14 up to 1982 litre 1.5
 B13, B14 from 1982 (M45R/M47R) litre 1.35
 D16 from 1985 (M47R) litre 1.35
 B172K (M47R) litre 1.35
 B19 (M45R) litre 1.5
 B19, B200 (M47R) litre 1.35

Automatic transmission

40 118

Primary and secondary gear housing

Lubricating oil (Europe):
 quality
 viscosity
 Lubricating oil (Nordic), type

API - GL - 4 or 5 or MIL - L - 2105 B or C
 SAE 80W - 90
 ATF type A/A or F, or Dextron

Capacity:
 primary gear housing litre 0.625
 secondary gear housing litre 1.120

Oil change capacity:
 primary gear housing litre 0.55
 secondary gear housing litre 1.00

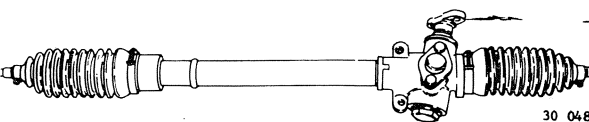
Sliding pulley halves

Lubricating oil, type
 Capacity:
 primary pulley halves cc 100
 secondary pulley halves cc 75

ATF type A/A or F, or Dextron

Steering gear

From chassis number 300000:
 original lubricant
 quantity cc
 lubricant for servicing



30 048

Tivela Compound
 100
 Volvo grease, Part No. 1161001 - 1

From chassis number 398386:
 original lubricant
 quantity cc
 lubricant for servicing

Alvania R1
 50
 Volvo grease, Part No. 1161001-1

Note:

Volvo grease 1161001 must not be mixed with Tivela Compound. When overhauling, thoroughly clean the steering housing and associated parts and then re-pack with Volvo grease 1161001.

Group 17 Service programme

Service inspection 300	km x 1000	10	20	30	40	50	60	70	80	90	100	110	120
	months	6	12	18	24	30	36	42	48	54	60	66	72
Handbrake - check/adjust Windscreen and headlight wipers/washers - check/adjust Doors, bonnet, boot lid/tailgate - grease the hinges and the bonnet lock	Remark: Full braking effect at 5-7 notches on ratchet Also greas the door check assemblies, striker plates and locks (not on tailgate of 3 and 5-doors models)		X		X		X		X		X		X
Front wheel bearings - check/adjust Steering gear/front suspension - check-tighten - check for wear Tyres - check			X				X		X		X		X
Brake linings - check Flexible brake hoses/shock absorbers - check for damage/leakage Clutch - check/adjust	Check when the brake linings are renewed!		X		X		X		X		X		X
Gearbox - check for leakage Propeller shaft - check for wear Exhaust system - check condition/gas tightness/mounting	Check if leakage is noted Check gaiters at rear end Check oil level if leakage is noted	X	X	X	X	X	X	X	X	X	X	X	X
Final drive (including AT) - check for leakage Automatic gearbox (AT) - change the transmission fluid Centrifugal clutch - check/adjust Pulley gap, drive belts - check/adjust	Check oil level if leakage is noted AT AT	X	X	X	X	X	X	X	X	X	X	X	X
					X				X				X
					X				X				X
			X		X		X		X		X		X

Service inspection 300		km x 1000	10	20	30	40	50	60	70	80	90	100	110	120
		months	6	12	18	24	30	36	42	48	54	60	66	72
Rear axle suspension - check-tighten - check for wear Brake and fuel pipes - check for damage/ leakage Fuel filter*	Remark			X										
	Also check the fuel filter							X		X		X		X
	Fuel injection and diesel engines			X		X		X		X		X		X
Fuel filter - drain water from filter Engines - check for leakage/ cleanness Engine oil and filter - change/renew	Diesel engines			X				X				X		
				X		X		X		X		X		X
		X	X	X	X	X	X	X	X	X	X	X	X	X
Rust protection/paintwork - corrosion inspection Washer fluid - check the fluid level Brake fluid - check the fluid level (leakage)				X		X		X		X		X		X
		X	X	X	X	X	X	X	X	X	X	X	X	X
		X	X	X	X	X	X	X	X	X	X	X	X	X
Power-assisted steering - check the fluid level Coolant - Check the frost protection and the fluid level Battery - check the electrolyte level/ anchorage and clean		X	X	X	X	X	X	X	X	X	X	X	X	X
		X	X	X	X	X	X	X	X	X	X	X	X	X
		X	X	X	X	X	X	X	X	X	X	X	X	X
Air filter - renew Fuel filter on carburettor engines - renew Crankcase ventilation - clean V-belts - check/adjust the tension	D16: every 20 000 km					X				X				X
						X				X				X
						X				X				X
	B13, B14, B200, D16 B172 (Poly V-belts)	X		X		X		X		X		X		X

*B200 E and F: also the plastic filter under the car. B200 K and B172 K: renew the filter in the fuel pipe.

Service inspection 300		km x 1000	10	20	30	40	50	60	70	80	90	100	110	120
		months	6	12	18	24	30	36	42	48	54	60	66	72
Sparks plugs - renew Valves - check/adjust Toothed belt and Poly V-belt - renew	Remark													
	See the specifications on page 54			X		X		X		X		X		X
	B14, B13 B172, D16 B200*			X		X		X		X		X		X
Toothed belt - renew EGR - clean Dashpot - check	B172, D16					X				X		X		
	B200									X				
	B200K					X				X				X
Cold-start injector - check Idle speed, fast + low - check/adjust CO content/ idle speed 20 000 km	B200K	X	X	X	X	X	X	X	X	X	X	X	X	X
	D16			X		X		X		X		X		X
	F engines: every	X	X	X	X	X	X	X	X	X	X	X	X	X
(EGR) - check for correct operation Rust protection*** - corrosion inspection Coolant - change Brake fluid - change Take the vehicle for a test drive														
	Markets with a corrosion protection warranty		X			X		X		X		X		X
	At the customer's request					X				X				X
	At the customer's request					X				X				X

* B200 running on propane (LPG): check the valves every 20.000 km.

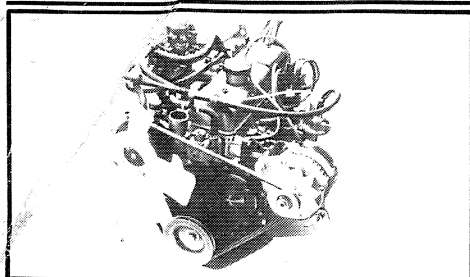
** Adjust the belt after the vehicle has been driven 1000 km and 1000 km after renewing the belt.

*** Carry out a corrosion inspection after 3 and 6 years; see SB 8-81-14

Section 2 Engines

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B172K Engine	page 28
B19 Engine	page 34
B200 Engine	page 43

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Group 28 Ignition system	page 54

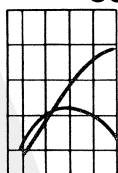
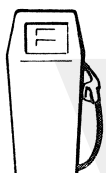


B14, B13 Engine

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Group 23 Fuel system	18

Group 20 General

Compression ratio, fuel octane requirements, output, torque



10 138

Engine	Compression verhouding	Fuel octaangetal	Output, ISO*		Max. torque, ISO*
			kW bij r/s	pk bij omw/min	Nm bij r/s
B14.0E B14.0S	9,5:1	-87 96 87- 95 (LFF)	51/92	70/5500	108/58
B14.1E B14.1S B14.2S	9,25:1	96	51/92	70/5500	108/58
B14.2E B14.3S	9,25:1	96	51/92	70/5500	105/42
B14.3E	9,25:1	96	47/92	64/5500	105/50
B14.4E(D) B14.4E B14.4S + oxi-cat	9,25:1 9,25:1 9,25:1	95 (LFF) -87 96 87- 95 (LFF) 95 (LFF)	51/90 52/90 50/85	69/5400 72/5400 68/5100	106/67 108/60 105/60
B14.4S	9,25:1	-87 96 87- 95 (LFF)	50/92	68/5500	110/42
B14.4O B13.4E	8,2 :1 8,9:1	91 92 96 95	49/90 49/90	67/5400 66/5400	98/50 108/60

* Due to standardization the engine output is now indicated by ISO standards. (This standard is approx. 1 to 2 % lower than the DIN standard)

Other general data

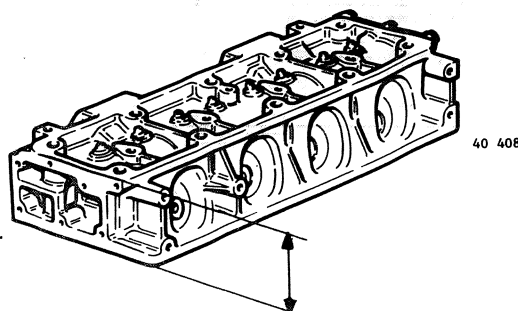
	B14	B13
Number of cylinders	4	4
Bore	76	73
Stroke	77	77
Displacement	1.397	1.289
Firing order	1 - 3 - 4 - 2	1 - 3 - 4 - 2
Compression (normal pressure, see note)	1.2 - 1.4 (12 - 14)	1.2 - 1.4 (12 - 14)

Note:

Compression measured with hot engine, fully opened throttle valve and with engine turned over by starter motor.

Group 21 Cylinder block

Cylinder head

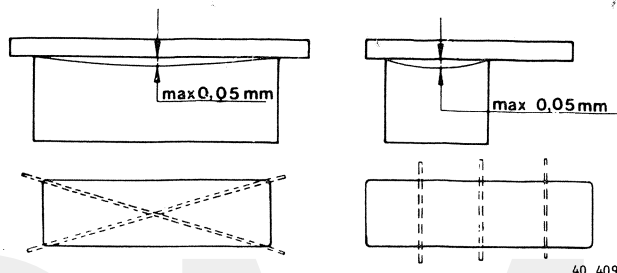


Height (in mm)

New: B14.0	= 72.60
B14.1/2/3/4/S	= 72.35
B13.4E	
B14.3E-4E	= 72.20
B14.40	= 73.60 ± 0.05

Minimum height after refacing: 0.3 lower

Maximum warp



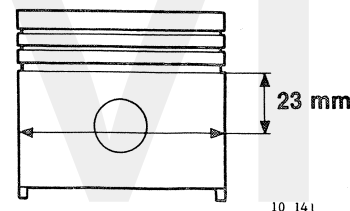
Cylinder liners

Not available singly: supplied in selected set of cylinder liner, piston and gudgeon pin.

	B14	B13
Nominal diameter	76	73
Projection of liners above cylinder block (without O-rings)	0.02 - 0.09	0.02 - 0.09
Maximum relative difference in height	0.04	0.04

Pistons

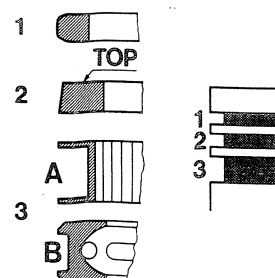
	B14	B13
Weight	300 - 316	328
Max. permissible weight difference between any 2 pistons in same engine	2	2
Height	64	62.7
Piston clearance	0.045 - 0.065	0.045 - 0.065
Diameter (nominal)	75.945	72.945



The piston diameter is measured at right-angles to the gudgeon pin hole and 23 mm from the underside of the oil scraper ring groove.

Piston rings

Upper compression ring		
height	mm	1.730 - 1.740
axial clearance in piston groove	mm	0.030 - 0.060
gap, measured in cylinder	mm	0.30 - 0.45
Lower compression ring		
height	mm	1.980 - 1.990
axial clearance in piston groove	mm	0.025 - 0.050
gap, measured in cylinder	mm	0.25 - 0.40
Oil scraper ring		
height, version A	mm	3.95 - 4.00
version B	mm	3.98 - 4.00
axial clearance in piston groove,		
version A	mm	0.025 - 0.070
version B	mm	0.025 - 0.050
gap, measured in cylinder,		
version A	mm	none
version B	mm	0.25 - 0.40



Note:

Version A of the oil scraper ring is the U-FLEX type, version B is the GOETZE type.

Gudgeon pins

Fit, in connecting rod	press fit
Fit, in piston mm	0.006 - 0.012

Valve system

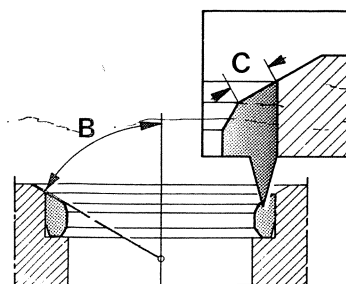
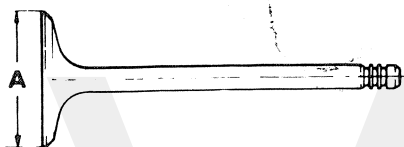
Valve clearances

	Control value/setting value
Inlet valves,	
cold engine mm	0.15
hot engine mm	0.20
Exhaust valves,	
cold engine mm	0.20
hot engine mm	0.25

Valve stem diameter

Inlet mm	7.010 - 7.032
Exhaust mm	7.020 - 7.042

Valves



42 654

Engine type	Chassis No.	Valves	Diameter (A)	Seat angle (B)	Seat width (C)
B14.0E	—393689	inlet valve	33.5 mm	45°	1.1 - 1.4 mm
B14.0S	—458000	exhaust valve	30.3 mm	45°	1.4 - 1.7 mm
B14.1E/S	388000—	inlet valve	34.2 mm	60°	1.1 - 1.4 mm
B14.2E/S	—610000*	exhaust valve	29 mm	45°	1.4 - 1.7 mm
B14.3S	—610000*				
B14.2E	610000—*	inlet valve	34.2 mm	45°	1.1 - 1.4 mm
B14.3E/S	610000—*	exhaust valve	29 mm	45°	1.1 - 1.4 mm
B14.4E/S/O	810500—				
B13.4E	731626—				

Holland and Belgium: chassis number 610000—

Remaining markets: 672000—

(B14.40 no valve stem seal on the inlet valve)

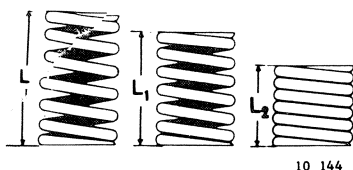
Valve guides

	B14.0	B14.1/2/3/4, B13
Length		
Inlet valve guide	41.5	
up to chassis number 458000		38.0
from chassis number 458000		37.5
Exhaust valve guide	41.5	41.5
Outside diameter:		
Standard, no grooves	11.00	11.00
Oversize 1, 1 groove	11.10	11.10
Oversize 2, 2 grooves	11.25	11.25

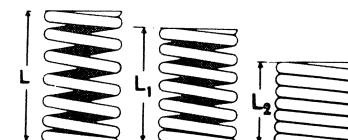
Valve springs

Holland and Belgium: up to chassis number 610000.
Remaining markets: up to chassis number 672000.

Holland and Belgium: from chassis number 610000.
Remaining markets: from chassis number 670000.



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Length	Loading
L 42.2 mm	0
L ₁ 32.0 mm	190 - 210 N
L ₂ 25.0 mm	342 - 378 N

Length	Loading
L 46.9 mm	0
L ₁ 32.0 mm	232 - 272 N
L ₂ 24.5 mm	360 - 400 N

Tappets

Diameter	mm	18.974 - 18.987
Height	mm	33.5
Tappet clearance in cylinder block	mm	0.013 - 0.047
Length of push rods	mm	173

Valve gear

Camshaft

Max. cam lift:

inlet cam	mm	4.949
exhaust cam	mm	4.934
Radial clearance	mm	0.05 - 0.10
End float	mm	0.05 - 0.10

With a theoretical valve lift of 1 mm:

inlet valve opens BTDC	0.5°
inlet valve closes ABDC	36°
exhaust valve opens BTDC	44°
exhaust valve closes ATDC	0.5°

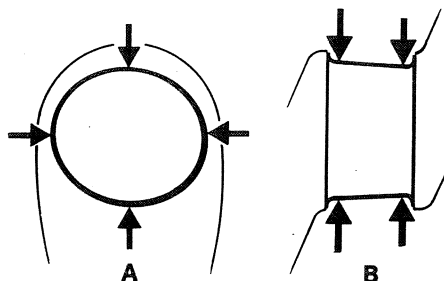
Crankshaft assembly

Crankshaft

End float	mm	0.05 - 0.23
Radial clearance (main bearings)	mm	0.032 - 0.074

Big-end bearings

Axial clearance	mm	0.31 - 0.57
Radial clearance	mm	0.032 - 0.065



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Main bearing journals

Max. ovality (A)	mm	0.0025
Max. taper (B)	mm	0.0025
Diameter, standard	mm	54.795 - 54.805
undersize 1	mm	54.545 - 54.555

Big-end bearing journals

Max. ovality	mm	0.0025
Max. taper	mm	0.0025
Diameter, standard	mm	43.960 - 43.980
undersize 1	mm	43.710 - 43.730
Bearing recess, width	mm	17.5 - 17.75

Thrust washer segments

Thickness, standard	mm	2.80
oversize	mm	2.95

Connecting rods

Max. permissible weight difference between con-rods in same engine	grammes	2
Weights:		
marked green-black	grammes	508 - 510
yellow	grammes	526 - 528
Axial clearance at crankshaft	mm	0.31 - 0.57

Flywheel

Max. axial throw, measured at a radius of 80 mm	mm	0.07
--	----	------

Tightening torques

The tightening torques specified here apply to oiled bolts and nuts; degreased (washed) components must be oiled before fitting.

	Nm
Cylinder head (see tightening sequence)	60
Main bearing caps	60
Big-end bearing caps	42
Flywheel (fit new bolts)	53
Camshaft sprocket	30
Camshaft lock washer	10
Crankshaft pulley bolt	80
Oil sump	8
Timing gear cover	8
Rocker shaft pedestal	16
Fuel pump	17
Chain tensioner	10
Water pump housing and cover	8
Engine mounting pads	53
Oil pump body and cover, bolts	8
Oil pressure switch	20
Subframe-to-engine, bolt	40
Oil drain plug, captive nut	25
Oil drain plug, nut integral with sump	35

Tightening the cylinder head bolts

The cylinder head bolts should be tightened in correct sequence and in 3 stages.

1st stage: tighten to **27 Nm**.

2nd stage: tighten to **60 Nm**.

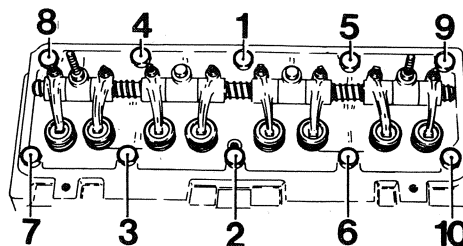
3rd stage:

run the engine warm for 20 minutes.

Allow the engine to cool down for 2.5 hours.

Slacken cylinder head bolt No. 1 a quarter-turn and then re-tighten to **60 Nm**.

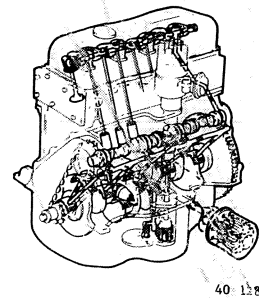
Repeat this in the correct sequence for the remaining bolts.



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Tightening sequence for cylinder head bolts

Group 22 Lubricating system

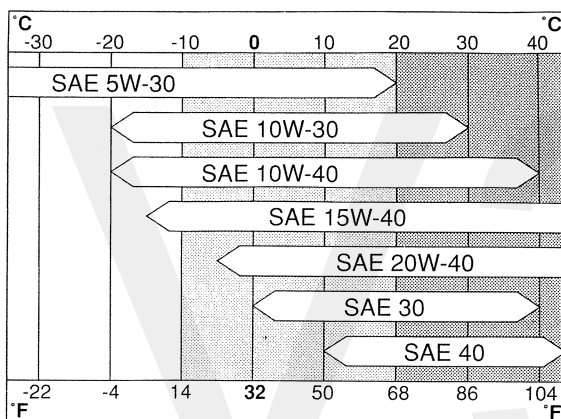


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General data

Oil capacity, excl. oil filter	litre	3.5
incl. oil filter	litre	4.0
Difference between max. - min. marks	litre	1.0
Oil pressure with new filter and hot engine:		
33 r/s (2000 r/min)	MPa	0.3 - 0.45
	kg/cm ²	3.0 - 4.5
Engine oil, type and quality		CCMC Service classification: G2 or G3
		API Service classification: SF.

Viscosity Temperature range (stable ambient temperature)



Under extreme driving conditions which can result in an abnormally high oil temperature and higher oil consumption, such as when driving in mountainous areas with frequent braking on the engine and in the case of high-speed driving on motorways, SAE 15W/40 or SAE 20W/40 oil is recommended, but always bear in mind the lowest temperature limit.

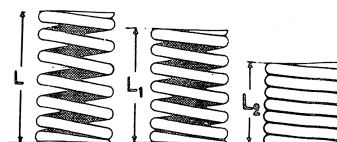
Oil pump

Axial clearance	mm	0.020 - 0.086
Radial clearance (excl. bearing clearance)	mm	0.095 - 0.222
Max. clearance between gears and pump body (backlash)	mm	0.200
Bearing clearance, —		
drive shaft	mm	0.024 - 0.049
idler shaft	mm	0.013 - 0.037

Relief valve spring

Length under various loadings

Length	Loading
L 46 mm	0 N
L ₁ 22 mm	25.1 - 27.9 N
L ₂ 18 mm	29.3 - 32.3 N



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Group 23 Fuel system

CO% at idling speed (hot engine)

Engine type	CO-percentage*		Idling speed	
	Setting value	Control value	r/s	r/min
B14.0	2.5	1.5 - 4.0	12.5	750
B14.1/2/3/4** B13.4E	2.0	1.5 - 3.0	AT: 13.3 ± 0.8 MT: 15 ± 0.8	800 ± 50 900 ± 50

- Engines **outside** the control values must be adjusted to the specified setting. —
- Engines **within** the control values need no further adjustment, providing the engine is running satisfactorily.
- Pulsair system (if fitted) disconnected and blanked off.
- Engines with a catalytic converter: measure ahead of the catalytic converter.
- ** B14 engines with a thermo-electric cooling fan (from 1984) must never be checked or adjusted while the fan is rotating. Adjustments should be made within 3 minutes after the thermostat has opened.

Fuel tank

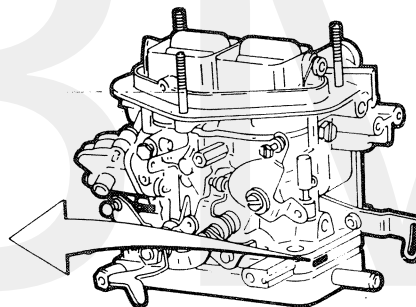
Total capacity litre 45
Reserve capacity (warning lamp in fuel gauge) litre 5

Carburettors

Weber 32 DIR (51 kW engines)

Identification number

32 DIR-00-000



40 410

Carburettor specifications for Weber 32 DIR up to model year 1982

	93-100/95-100		Others	
	1st stage	2nd stage	1st stage	2nd stage
Venturi inside diameter mm	24	24	23	24
Main jet (fuel)	110 - 115	132 - 135	125 - 130*	117 - 123
Main jet (air)	135 - 155	155 - 175	170 - 190	125 - 145
Emulsion tube	F20	F6	F53	F6
Idle jet (fuel)	42 - 48	47 - 53	44 - 50	55 - 65**
Idle jet (air)	125 - 145	65 - 75	105 - 125	—
Accelerator pump jet	60	—	50	—
Mechanical choke valve opening mm	3.5 - 4.5	3.5 - 4.5	3.5 - 4.5	3.5 - 4.5
Pneumatic choke valve opening mm	5.5 - 6.5	5.5 - 6.5	4 - 5***	4 - 5***
Throttle valve opening with full choke mm	0.85 - 0.95	—	0.85 - 0.95	—
Float needle Ø mm		1.75		1.75
Float weight grammes		11		11
Float height (measured with gasket) mm		7		7
Float chamber ventilation valve, stroke mm		2 ± 0.5		2 ± 0.5

* for 84 - 100 : 127 - 133

** for 74 - 100 / 83 - 100 / 85 - 100 : 0

*** for 85 - 100 : 5.5 - 6.5

Service

If the 32 DIR 73-100/32 DIR 57-8400 carburettors, or 32 DIR 74-100/32 DIR 48-6200 carburettors have to be replaced, fit 32 DIR 57-8401 and 32 DIR 48-6201, respectively.

If the second stage is still fitted with an open idle jet, this **must** be replaced by a blind jet, Part No. 3277425-9.

Carburettor specifications for Weber 32 DIR 93-101/95-101, model year 1982-1983 and

Weber 32 DIR 104-100/105-100, model year 1984.

Weber 32 DIR 109 (B14. 4E) model year '86 (with fuel cut-off): specifications identical to the Weber 32 DIR 104.

Weber 32 DIR 109 Rep 101 (B14.4E, B13.4E), main jet: 122.

Weber 32 DIR 110 (B14. 4O) model year '86 (no fuel cut-off): specifications identical to the Weber 32 DIR 105.

	93-101/95-101		104-100/105-100****		110/100	
	1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
Venturi inside diameter mm	24	24	23	24	23	24
Main jet (fuel)	110-115	132-135	120-125**	135-140	115-120	135-140
Main jet (air)	145-165*	—	180-200	180-200	185-195	185-195
Emulsion tube	F20	F6	F20	F20	F20	F20
Idle jet (fuel)	47-53	0	47-53	47-53	50	50
Idle jet (air)	125-145	65-75	130-140***	65-75	135	70
Accelerator pump injector	45	45	45	45	45	—
Mechanical choke valve opening mm	3.5-4.5	3.5-4.5	3.5-4.5	—****	3.5-4.5	—
Pneumatic choke valve opening mm	5.5-6.5	5.5-6.5	5.5-6.5	—****	5.5-6.5	—
Throttle valve opening with full choke mm	0.85-0.95	—	0.85-0.95	—	—	—
Needle valve Ø mm		1.75		1.75		1.75
Float weight grammes	11		11		11	
Float height (measured with gasket) mm	7		7		7	
Tightening torque, retaining nuts Nm	16-20		16-20		16-20	

* for 95 - 101 : 135 - 155

** for 105 - 100 : 122 - 127

*** for 105 - 100 : 130 - 140

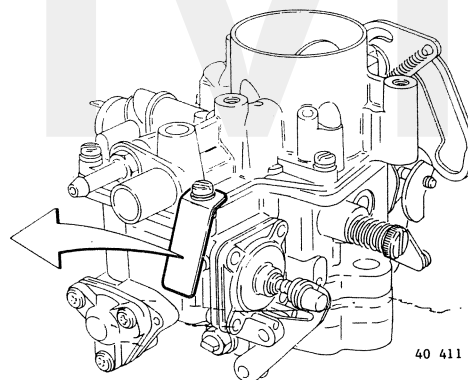
**** The choke valve in the 2nd stage was discontinued with effect from model year 1984.

***** For 104 (101 - 102): no bypass in the idle jet.

Solex 32 - SEIA REN 796 and 814 (47 kW engine)

Identification number

32 - SEIA REN 796
32 - SEIA REN 814
32 - SEIA REN 828



40 411

Carburettor specifications

	32 - SEIA REN 796	32 - SEIA REN 814	32 - SEIA REN 828
Venturi diameter mm	24	24	24
Auxiliary venturi	asymmetrical	symmetrical	symmetrical
Main jet (fuel)	125.5 - 130.5	120 - 125	120 - 125
Main jet (air)	150 - 160	160 - 170	160 - 170
Idle jet	42 - 48	40 - 46	40 - 46
Accelerator pump injector	35	35	35
Needle valve Ø mm	1.5	1.5	1.5
Float weight grammes	5.2	5.2	5.2
Float level mm	22.7	22.7	22.5
Mechanical choke valve opening mm	4 - 5	4 - 5	4 - 5
Throttle valve with full choke mm	0.8	0.8	0.8
Emulsion tube	X16	X17	X17
Float chamber ventilation valve, stroke mm	3.5 ± 0.5	3.5 ± 0.5	3.5 ± 0.5
Tightening torque, retaining nuts Nm	16 - 20	16 - 20	16 - 20

Air supply

Type of system:

thermostatic

(Europe, up to chassis number 332021: mechanical)

Control range:

up to chassis number 388000 °C

17.5 - 26

chassis number 388000 - 545000 °C

20 - 35

from chassis number 545000 °C

25 - 35

Air filter

paper element

Decelerating mechanism

Settings:

B14.0S: with microswitch r/s (r/min)

26.7 - 28.3 (1600 - 1700)

with vacuum control unit r/s (r/min)

32.5 - 34.2 (1950 - 2050)

B14.1S/2S r/s (r/min)

25.0 - 26.7 (1500 - 1600)

B14.3S automatic r/s (r/min)

25.0 - 26.7 (1500 - 1600)

B14.3S manual r/s (r/min)

32.5 - 34.2 (1950 - 2050)

B14.4S/O r/s (r/min)

25.0 - 26.7 (1500 - 1600)

Vacuum switch¹⁾

Type

Solex Calorstat

Operating pressure kPa (kg/cm²)

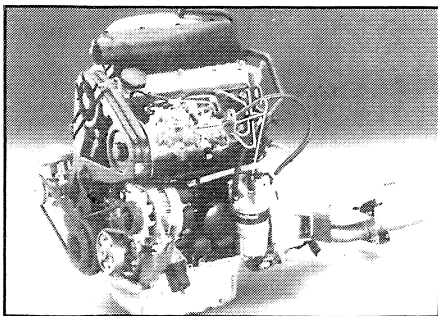
73.5 ± 5 (0.735 ± 0.05)

¹⁾Discontinued with effect from model year 1981

Fuel pump

Delivery pressure, measured at same height as pump, at
16.6 r/s (1000 r/min) kPa (kg/cm²)

16 - 26 (0.16 - 0.26)

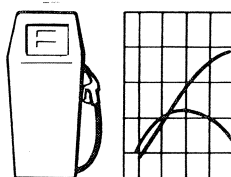


D16 Engine

Group 20 General	Page 21
Group 21 Cylinder block	21
Group 22 Lubricating system	25
Group 23 Fuel system	26

Group 20 General

Compression ratio, Cetane number, output, torque



10 138

Engine	Compression ratio	Diesel oil requirement	Output, ISO		Max. torque, ISO
			kW at r/s	hp at r/min	Nm at r/s
D16	22.5:1	51,601, CEC-ERF-DI	40/80	54.4/4800	100/37.5

Other general data

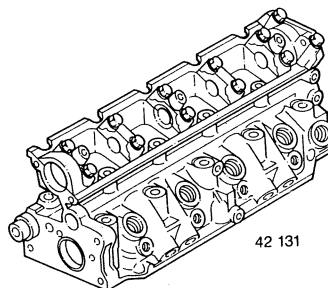
Number of cylinders	4
Bore mm	78
Stroke mm	83.5
Displacement dm ³ (litre)	1.596
Injection and firing order	1 - 3 - 4 - 2 (No. 1 cylinder at flywheel end)
Compression pressure (normal pressure, see note) MPa(kg/cm ²)	2 - 3 (20 - 30)

Note:

Compression measured with hot engine and with engine turned over by starter motor.

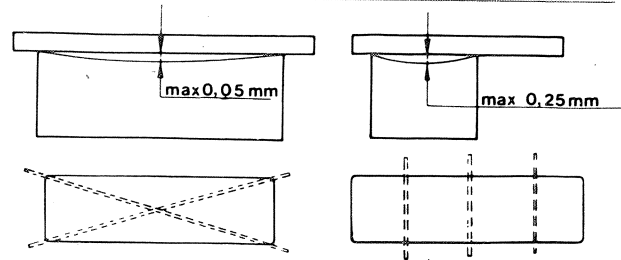
Group 21 Cylinder block

Cylinder head



Height	mm	159.5 (± 0.2)
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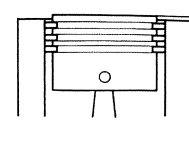
Maximum warp



40 140

Pistons

Weight (tolerance) grammes 614 (± 2,5)
 Max. permissible height difference between
 pistons with same height code (tolerance) mm ± 0.6
 Nominal piston height mm 74.5



< 0,885	oo
0,885 - 0,985	-
> 0,985	ooo

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Diameters		Piston diameter	Cylinder bore	Clearance
Standard,	class A	77,875 - 77,890	78,000 - 78,015	0,11 - 0,14
	class B	77,890 - 77,905	78,015 - 78,030	0,11 - 0,14
	class U	78,125 - 78,140	78,250 - 78,265	0,11 - 0,14
	class V	78,140 - 78,155	78,265 - 78,280	0,11 - 0,14
Oversize,	class AJR	77,935 - 77,950	78,000 - 78,015	0,05 - 0,08
	class BJR	77,950 - 77,965	78,015 - 78,030	0,05 - 0,08
	class UJR	78,185 - 78,200	78,250 - 78,265	0,05 - 0,08
	class VJR	78,200 - 78,215	78,265 - 78,280	0,05 - 0,08

The piston diameter is measured at right-angles to the gudgeon pin hole and 60 mm from the upper surface.

Cylinder head gasket

Projecting height of pistons above cylinder block:

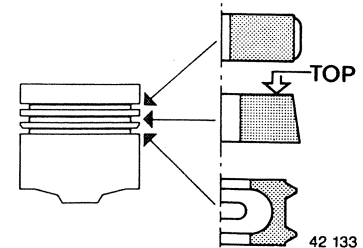
cylinder head gasket, size mm A 1.65 < 0.885 oo
 mm B 1.75 0.885 - 0.985 o
 mm C 1.85 > 0.985 ooo

Gudgeon pins

Fit, in connecting rod light thumb pressure (close sliding fit)
 Fit, in piston mm 0.006 - 0.012
 Diameter mm 24

Piston rings

Upper compression ring
 height mm 2
 axial clearance in piston groove mm 0.06 - 0.095
 gap, measured in cylinder mm 0.30 - 0.45
 Lower compression ring, tapered
 height mm 2
 axial clearance in piston groove mm 0.04 - 0.075
 gap, measured in cylinder mm 0.30 - 0.45
 Oil scraper ring
 height mm 3
 axial clearance in piston groove mm 0.02 - 0.055
 gap, measured in cylinder mm 0.25 - 0.40



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Valve system

When changing tappet pads, the piston must not be at T.D.C. The crankshaft must be turned to bring it just past T.D.C., otherwise the valves may strike the piston when the tappets are depressed.

Valve clearances (cold engine)

	when checking	when adjusting
inlet valves mm	0.15 - 0.25	0.20
exhaust valves mm	0.35 - 0.45	0.40

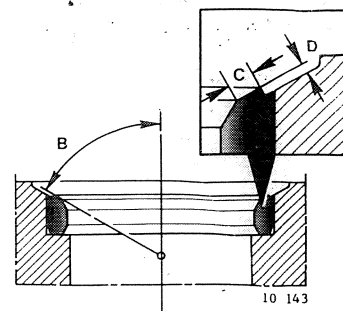
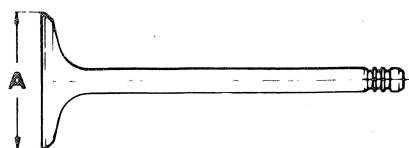
Valve stem diameter

inlet mm	8.005 - 8.027
exhaust mm	8.018 - 8.040

Valve seat

Bore in cylinder head, inlet/exhaust mm	37
Oversize mm	37,3

Valves



Engine type	Valves	Diameter (A)	Seat angle (B)	Seat width (C)
D16	inlet valve	36.1 mm	60°	1.8 mm
	exhaust valve	31.5 mm	45°	1.8 mm

After machining or grinding, the valve seat must be 0.125 ± 0.0025 mm higher than the cylinder head (see D).

Valve guides

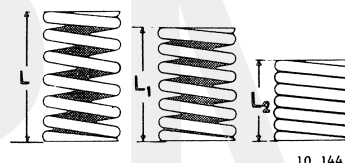
Outside diameter	mm	8
Outside diameter		
standard, no grooves	mm	13.03
oversize, 2 grooves	mm	13.36

The bore diameter in the cylinder head should be about **0.1 mm** smaller in order to obtain a good fit.

Valve springs*

Length	Loading
L 37.9 mm	230 N
L ₁ 28.4 mm	705 N
L ₂ 25.8 mm	875 N

* Colour code: beige



Tappets

Diameter	mm	35
(tolerance)	mm	0.01 - 0.04
Tappet clearance in cylinder block	mm	0.025 - 0.075
		3.25 - 4.30, increasing by increments of 0.05 mm
		4.30 - 4.50, increasing by increments of 0.10 mm

Timing gear

Camshaft

Number of bearings	5
Max. cam lift, inlet cam	7.54 mm
exhaust cam	8.93 mm
Radial clearance	0.05 - 0.15 mm
End float	0.05 - 0.13 mm

Valve timing:

	- 1987	1988 -
— inlet valve opens BTDC	6°	6°
— inlet valve closes ABDC	30°	30°
— exhaust valve opens BBDC	46°	50°
— exhaust valve closes ATDC	6°	2°

With a theoretical valve clearance of:

— inlet valve	mm	0.40
— exhaust valve	mm	0.50

Timing belt

Timing belt adjustment (with special tool 8500)	units	1.5 ± 0.2
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Crankshaft assembly

Intermediate shaft

inner bearing bush, bore	mm	39.5
outer bearing bush, bore	mm	40.5
end float	mm	0.07 - 0.15

Flywheel

Max. axial throw, measured at a radius of 80 mm	mm	0.07
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Crankshaft

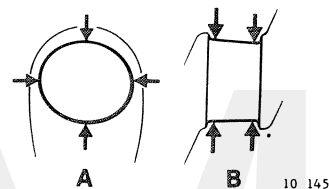
End float	mm	0.07 - 0.23
Thrust washer thicknesses	mm	2.30 - 2.45 (increasing by increments of 0.05 mm)
Radial clearance (main bearings)	mm	0.04 - 0.07

Main bearing journals

Max. ovality (A)	mm	approx 0.0025
Max. taper (B)	mm	0.005
Diameter, standard (bleu)	mm	54.785 - 54.795
Diameter, standard (red)	mm	54.795 - 54.805
undersize 1	mm	54.535 - 54.555

Big-end bearing journals

Max. ovality (A)	mm	0.000 - 0.0025
Max. taper (B)	mm	0.005
Diameter, standard	mm	48.00 (+ 0.02)
undersize 1	mm	47.75 (+ 0.02)
Bearing recess, width	mm	20.60 $\pm$ 0.35
Max. relative difference	mm	0.02



Big-end bearings

Axial clearance	mm	0.22 - 0.40
Radial clearance	mm	0.031 - 0.075

Connecting rods

Weight of connecting rod small end	grammes	195 $\pm$ 1.0
big-end	grammes	485 $\pm$ 1.5

Tightening the cylinder head bolts: sequence and torque

Lightly oil the screw thread and mating surface of the bolt heads. Insert the cylinder head bolts and tighten with hand pressure only. The cylinder head bolts should be torque-tightened in **2 stages**.

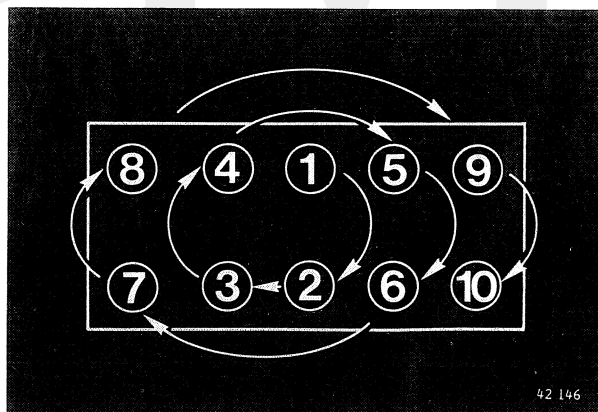
Tighten in the first stage:

- first to **30 Nm**.
- then to **70 Nm**.

Wait at least **3 minutes** to allow the head gasket to bed down properly.

Now **slacken all the bolts completely** and then retighten to the **second stage** torque:

- first to **20 Nm**.
- then angle-tighten the bolts to **123° $\pm$ 2°** in a single, uninterrupted movement, with special tool **5098**.

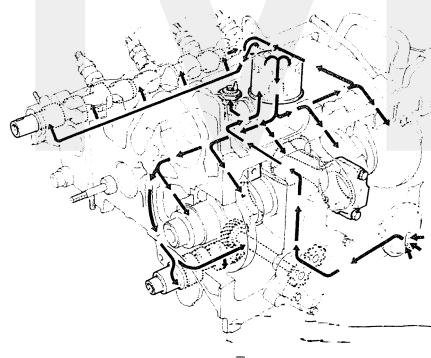


Tightening torques

The tightening torques specified here apply to oiled bolts and nuts; degreased (washed) components must be oiled before fitting.

	Nm
Big-end bearing cap	45
Main bearing bush, bore	60
Plug in cylinder block (counterhold)	20
Tensioning sprocket, timing belt, nut	50
Idler pulley, bolt	27.5
Crankshaft pulley, bolt	95
Timing belt guards, bolts	10
Camshaft sprocket wheel	50
Camshaft bearing caps, bolts, M6	10
M8	20
Camshaft rear cover, bolts	22.5
nuts	22.5
Glow plugs	22.5
Intermediate shaft gearwheel, bolt	50
Flywheel, bolts	53
Inlet and exhaust manifolds, nuts	20
Valve cover, nuts	5
Vacuum pump, bolts, M8	37
other size bolts	21
Sump, drain plug	22
Engine bracket, front, nuts	52
rear, nuts	47
Engine bracket, aluminium, bolts	20
Sump, bolts	13
Oil pump, bolts	20
Oil pump, cover	12
Oil pressure switch	25

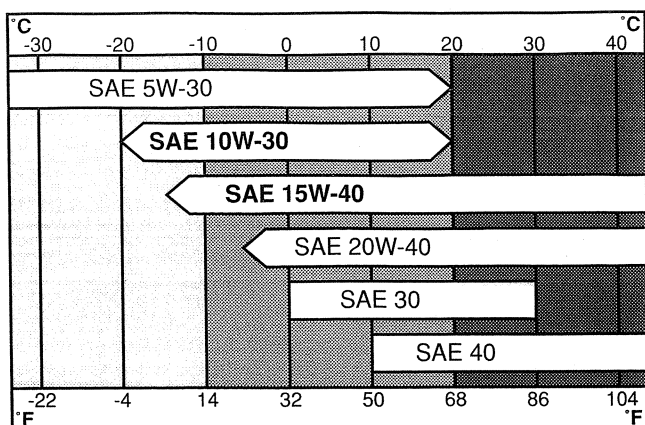
Group 22 Lubricating system



General data

Oil capacity, excl. oil filter	litre	4.5
incl. oil filter	litre	5
Difference between max. - min. marks	litre	1.5
Oil pressure at +80°C oil temperature and 50 r/s (3000 r/min)	MPa (kg/cm ²)	350 (3.5)
Engine oil, type and quality	API Service classification, minimum CD (oils designated SE/CD SF/CD, SC/CD and Sd/CD comply with this standard). CCMC Service classification, class D2/PD1	

Viscosity Temperature range (stable ambient temperature)



Note: under extreme driving conditions which can lead to abnormally high oil consumption, such as when driving in mountainous areas with frequent braking on the engine or high-speed motorway driving, the recommended oils are SAE 15W/40 or SAE 20W/40; but always bear in mind the lowest temperature limit.

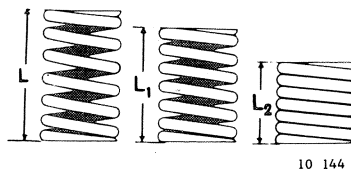
Oil pump

Axial clearance	mm	0.02 - 0.08
Max. clearance between gears and pump body (backlash)	mm	0.10 - 0.24
Bearing clearance, drive shaft	mm	0.024 - 0.049

Relief valve spring

Length under various loadings

	Length	Loading
L	37.9 mm	23 N
L ₁	28.4 mm	705 N
L ₂	25.8 mm	857 N



Group 23 Fuel system

General data

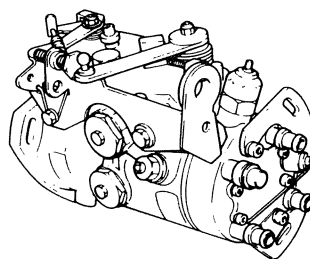
Injection and firing order (No. 1 cylinder at flywheel end)	1 - 3 - 4 - 2
Max. engine speed	
run-away speed (max. no-load speed)	r/min 5300 ± 100
governed speed (max. speed under load)	r/min 4800
idling speed	r/min 850

Smoke content at idling speed (hot engine)

Engine type	Smoke percentage		Idling speed	
	Setting value	Control value	r/s	r/min
D16	1.23m-1 : 39.5%	2m-1 : 55%	14.2	850

Fuel tank

Total capacity	litre	46
Reserve capacity	litre	5



Fuel injection pump

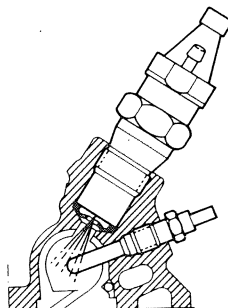
Type	mm	rotary distribution
Merkaanduiding	mm	CAV Roto Diesel DPC X 42 - 1, CH — 431822
		CAV Roto Diesel F8M RA 02, CH 431823 —

Preglowing system

Four glow plugs with a maximum preglowing time of 30 seconds. The system remains energized for approx. 45 seconds after the warning lamp on the dashboard has gone out.

Injection timing CH — 431822 mm
Injection timing CH 431823 — mm

Control value **Setting value**
1.58 - 1.62 1.60
Setting value is shown on the pump.
Adjust with special tool 5382.



Roto RDN 0 SDC

Fuel injectors

Make and designation

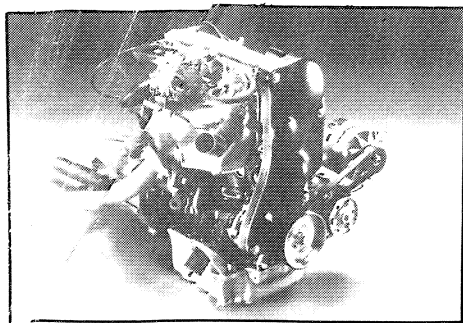
Fuel injector, opening pressure kg/cm²

Control value **Setting value**
110 - 120 115

Tightening torques

The tightening torques specified here apply to oiled bolts and nuts; degreased (washed) components must be oiled before fitting.

	Nm
Fuel filter, bolt	12.5
Fuel delivery lines	22.5
Injectors	70
Fuel injection pump, plug	20
Cylinder block, plug (TDC point)	20
Engine manifolds, nuts	20
Fuel injection pump gearwheel, nut	50
Tensioning sprocket, nut	50
Water pump, bolt	12.5
Wax thermostat	40
Thermostat housing, bolts	22.5
Fuel injection pump, bolts	22.5
Fuel pump, banjo union screws	22.5
Fuel filter, banjo union screws	40.0
Plug on top of fuel injection pump (from CH 431823 —) ..	10

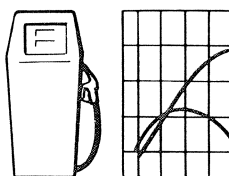


B172 Engine

Group 20 General	Page 28
Group 21 Cylinder block	28
Group 22 Lubricating system	32
Group 23 Fuel system	33

Group 20 General

— Compression ratio, fuel octane requirements, output, torque



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Engine	Compression ratio		Fuel octane	Output, ISO		Max. torque, ISO
				kW at r/s	hp at r/min	Nm at r/s
B172K-400	—'87	10.0:1	98	60/90	80/5400	135/55
B172K-459	'87—	9.5:1	95	60/90	80/5400	131/55
B172K(D)-459		9.5:1	95	59/90	80/5400	130/48

Other general data

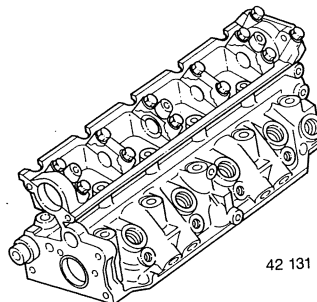
Number of cylinders	4
Bore	81 mm
Stroke	83.5 mm
Displacement	1.721 dm ³ (litre)
Firing order	1 - 3 - 4 - 2 (No. 1 cylinder at flywheel end)
Compression pressure (normal pressure, see note)	1.2 - 1.4 (12 - 14) MPa(kg/cm ²)

Note:

Compression measured with hot engine, fully opened throttle valve and with the engine turned over by the starter motor.

Group 21 Cylinder block

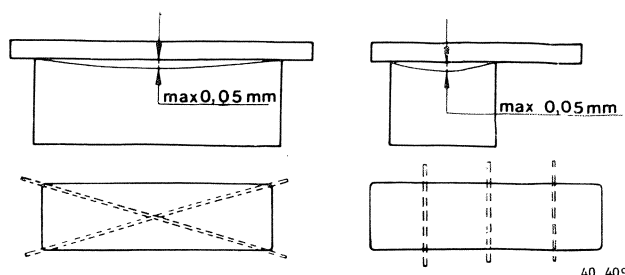
Cylinder head



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Height	169.5 (± 0.2) mm
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Maximum warp



Pistons

Weight (with gudgeon pin)	grammes	499 ± 2.5
Combustion chamber volume — '87	cc	25.2
Combustion chamber volume '87 —	cc	28.5
Nominal piston height	mm	70.2

Diameter		Piston diameter	Cylinder bore	Clearance
Standard,	class A mm	80,950 - 80,960	81,000 - 81,010	0,040 - 0,060
	class B mm	80,960 - 80,970	81,010 - 81,020	0,040 - 0,060
	class C mm	80,970 - 80,980	81,020 - 81,030	0,040 - 0,060
Oversize,	class U mm	81,200 - 81,210	81,250 - 81,260	0,040 - 0,060
	class V mm	81,210 - 81,220	81,260 - 81,270	0,040 - 0,060
	class W mm	81,220 - 81,230	81,270 - 81,280	0,040 - 0,060

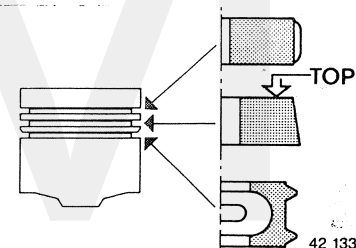
The piston diameter is measured at right-angles to the gudgeon pin hole and 44 mm from the upper surface.

Gudgeon pins

Fit, in connecting rod	press fit	
Fit, in piston	mm	0.006 - 0.018
Diameter	mm	21

Piston rings

Upper compression ring		
height	mm	1.75
axial clearance in piston groove	mm	0.06 - 0.095
gap, measured in cylinder	mm	0.30 - 0.45
Lower compression ring, tapered		
height	mm	2
axial clearance in piston groove	mm	0.04 - 0.075
gap, measured in cylinder	mm	0.25 - 0.40
Oil scraper ring		
height	mm	3
axial clearance in piston groove	mm	0.02 - 0.055
gap, measured in cylinder (Goetze)	mm	0.25 - 0.40
(Uniflex: no gap clearance)		



Valve system

When changing tappet pads, the piston must not be at T.D.C. The crankshaft must be turned to bring it just past T.D.C., otherwise the valves may strike the piston when the tappets are depressed.

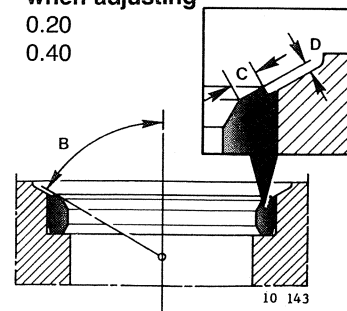
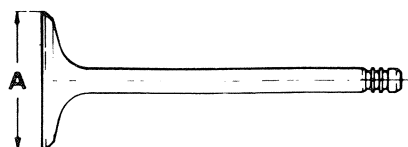
Valve clearances (cold engine)

		when checking	when adjusting
inlet valves	mm	0.15 - 0.25	0.20
exhaust valves	mm	0.35 - 0.45	0.40

Valve stem diameter

inlet	mm	8.020 - 8.042
exhaust	mm	8.018 - 8.040

Valves



Engine type	Valves	Diameter (A)	Seat angle (B)	Seat width (C)
B172K	inlet valve	38.1 mm	60°	1.7 ± 0.2 mm
	exhaust valve	32.5 mm	45°	1.7 ± 0.2 mm

After machining or grinding, the valve seat must be 0.125 ± 0.0025 mm higher than the cylinder head (see D).

Seat bore, inlet	mm	39
Seat bore, exhaust	mm	33.6

Outside diameter	mm	8
Outside diameter standard, no grooves	mm	13
oversize, 2 grooves	mm	13.25

The bore diameter in the cylinder head should be about **0.1 mm** smaller in order to obtain a good fit.

Length	Loading
L 44.9 mm	unloaded
L 37.9 mm	267 N
L ₁ 28.4 mm	715 N
L ₂ 25.6 mm	948 N

Diameter	mm	35
(tolerance)	mm	0.01 - 0.04
Tapet clearance in cylinder block	mm	0.025 - 0.075
		3.25 - 4.50, increasing by increments of 0.05 mm
		4.30 - 4.50 increasing by increments of 0.10 mm

Number of bearings		5
Max. cam lift, inlet cam	mm	8.23
exhaust cam	mm	8.44
Radial clearance	mm	0.05 - 0.15
End float	mm	0.05 - 0.13

— inlet valve opens BTDC	4°
— inlet valve closes ABDC	40°
— exhaust valve opens ABDC	40°
— exhaust valve closes BTDC	4°

— inlet valve	mm	0.40
— exhaust valve	mm	0.50

Timing belt adjustment (with special tool 8500)	units	1.5 ± 0.2
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inner bearing bush, bore	mm	39.5
outer bearing bush, bore	mm	40.5
end float	mm	0.07 - 0.15

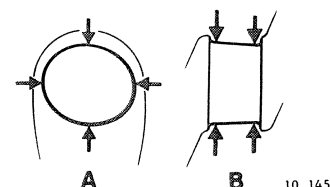
Max. axial throw,
measured at a radius of 80 mm mm 0.07

Crankshaft

End float	mm	0.07 - 0.023
Thrust washer thicknesses	mm	2.30 - 2.50
Radial clearance (main bearings)	mm	0.04 - 0.075

Main bearing journals

Max. ovality (A)	mm	approx 0.0025
Max. taper (B)	mm	0.005
Diameter, standard (bleu)	mm	54.785 - 54.795
Diameter, standard (red)	mm	54.795 - 54.805
undersize 1	mm	54.535 - 54.555



Big-end bearing journals

Max. ovality (A)	mm	0.000 - 0.0025
Max. taper (B)	mm	0.005
Diameter, standard	mm	48.00 (+ 0.02)
undersize 1	mm	47.75 (+ 0.02)
Bearing recess, width	mm	20.60 ± 0.35
Max. relative difference	mm	0.02

Big-end bearings

Axial clearance	mm	0.22 - 0.40
Radial clearance	mm	0.031 - 0.075

Connecting rods

Weight of connecting rod small end	grammes	643 ± 3
--	---------	---------

Tightening the cylinder head bolts: sequence and torque

Lightly oil the screw thread and mating surface of the bolt heads. Insert the cylinder head bolts and tighten with hand pressure only. The cylinder head bolts should be torque-tightened in **2 stages**.

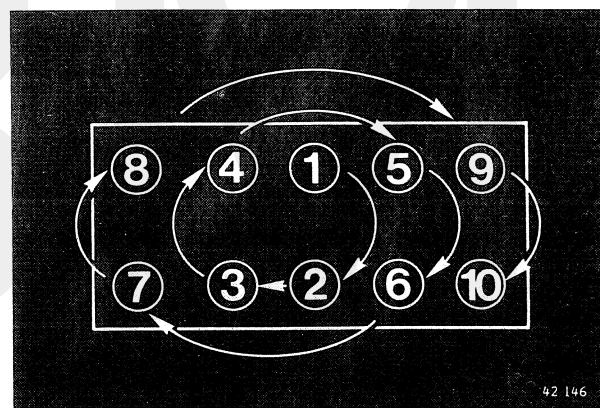
Tighten in the first stage:

- first to 30 Nm.
- then to 70 Nm.

Wait at least 3 minutes to allow the head gasket to bed down properly.

Now slacken all the bolts completely and then retighten to the **second stage** torque:

- first to 20 Nm.
- then angle-tighten the bolts to $123^\circ \pm 2^\circ$ in a single, uninterrupted movement, with special tool 5098.



Tightening torques

The tightening torques specified here apply to oiled bolts and nuts; degreased (washed) components must be oiled before fitting.

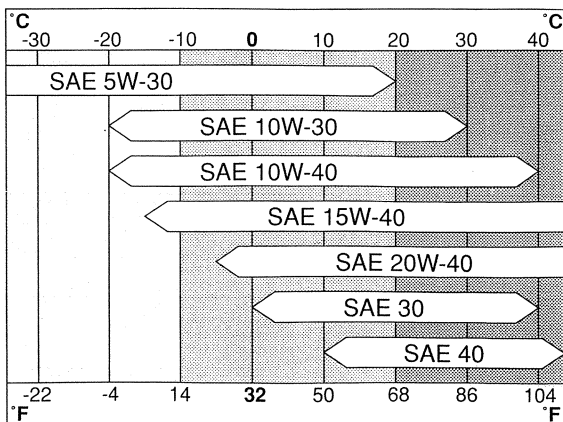
	Nm
Cylinder block, plug	20
Tensioning sprocket, timing belt, nut	50
Idler pulley, bolt	27.5
Crankshaft pulley, bolt	95
Timing belt guards, bolts	10
Camshaft sprocket wheel	50
Camshaft bearing caps, bolts, M6	10
M8	20
Main bearing caps	62.5
Big-end bearing caps	47.5
Intermediate shaft gearwheel, bolt	50
Flywheel, bolts	53
Inlet and exhaust manifolds, nuts	20
Timing cover	5
Valve cover, nuts	5
other size bolts	21
Sump, drain plug	25
Engine bracket, front, nuts	52
rear, nuts	47
Engine bracket, aluminium, bolts	20
Sump, bolts	13
Oil pump, bolts	22.5
Oil pump, cover	12
Water pump housing	12.5
Oil pressure switch	25

Group 22 Lubricating system

General data

Oil capacity, excl. oil filter	litre	4.5
incl. oil filter	litre	5
Difference between max. - min. marks	litre	1.5
Oil pressure at +80°C oil temperature and 50 r/s (3000 r/min)	MPa (kg/cm ²)	350 (3.5)
Engine oil, type and quality	CCMC Service classification: G2 or G3. API Service classification: SF.	

Viscosity Temperature range (stable ambient temperature)



Note: under extreme driving conditions which can lead to abnormally high oil consumption, such as when driving in mountainous areas with frequent braking on the engine or high-speed motorway driving, the recommended oils are SAE 15W/40 or SAE 20W/40; but always bear in mind the lowest temperature limit.

Oil pump

Axial clearance	mm	0.02 - 0.08
Max. clearance between gears and pump body (backlash)	mm	0.10 - 0.24
Bearing clearance, drive shaft	mm	0.024 - 0.049

Group 23 Fuel system

CO content at idling speed (hot engine)

Engine type	CO-percentage*		Idling speed	
	Setting value	Control value	r/s	r/min
B172K	1	0.5 - 2.0	15	900 ± 50

* — Engines outside the control values must be adjusted to the specified setting.

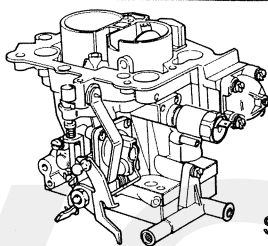
— Engines within the control values need no further adjustment, providing the engine is running satisfactorily.

— Engines with a catalytic converter: measure ahead of the catalytic converter.

Fuel tank

Total capacity	litre	45
Reserve capacity	litre	5

Carburettor



Specifications

Solex 28 - 34 Z10 Ren 857 Solex 28 - 34 Z10 Ren 894

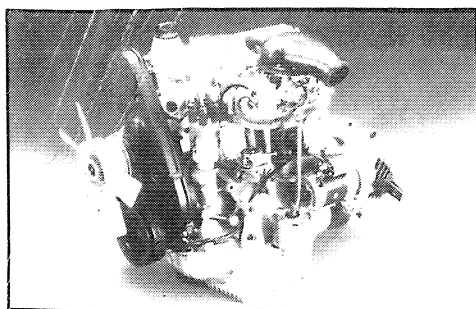
	1st stage	2st stage	1st stage	2nd stage
Venturi inside diameter	20	26	20	26
Main jet (fuel)	95	117,5	92.5	117
Main jet (air)	185	150	165	135
Emulsion tube	ZY		ZL	
Idle jet (fuel)	40		40	40
Idle jet (air)	160		160	70
Accelerator pump injector	35	35	35	35
Accelerator pump bearing	202			
Pneumatic choke valve opening	0.7 - 0.9 at 420 mbar / 1.4 - 1.6 at 600 mbar			
Throttle valve opening with full choke	2.5			
Float needle	1.8			
Float weight	6 ± 1			
Float height (measured with gasket)	33.8			
Float chamber ventillation valve, stroke	3 - 4			

Fuel pump

Type	Sofabex M 8736
Delivery pressure, measured at same height as pump, at 16.6 r/s (1000 r/min)	16 - 28 (0.16 - 0.28)

Tightening torques

	Nm
Fuel pump	14
Carburettor	12
Inlet and exhaust manifold	18
Throttle linkage on manifold	9
Thermo-switch (radiator)	18
Water pump	12.5
Water pump pulley	21
Thermostat housing	9
Electric fuel cut-off	1
Stud, air filter	9
Nuts, air filter	5

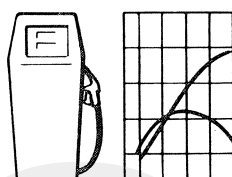


B19 Engine

	Page
Group 20 General data	34
Group 21 Cylinder block	34
Group 22 Lubricating system	39
Group 23 Fuel system	40

Group 20 General data

Compression ratio, fuel octane requirements, output, torque



10 138

Engine	Compression ratio	Fuel octane	Output, ISO**		Max. torque, ISO**
			kW at r/s	hp at r/min	Nm at r/s
B19A 568, 854 906, 982, 984	9.2:1	96	70/90	95/5400	150/60
B19A 552, 566 658, 660	10:1	98	68/90*	92.4/5400*	152/55
B19A 902	8.5:1	91	65/85	91/5100	140/55
B19E 554, 556 862, 864	10:1	98	85/95	115/5700	160/60

* B19A (658) : 68/92 and 94/5500

** Due to standardization the engine output is now indicated by ISO standards (this standard is approx. 1 to 2% lower than the DIN standard).

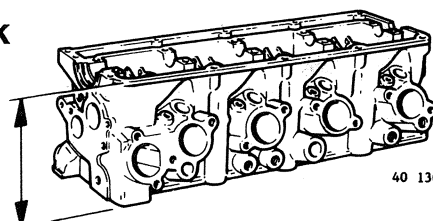
Other general data

Number of cylinders	4
Bore	88.9 mm
Stroke	80 mm
Displacement	1.986
Firing order	1 - 3 - 4 - 2
Final compression pressure (measured with hot engine, fully opened throttle valve and engine turned over by starter motor)	1.1 - 1.25 (11 - 12.5) MPa (kg/cm ²)
for the B19A	0.9 - 1.1 (9 - 11) MPa (kg/cm ²)
(568-854-906-982-984)	

Group 21 Cylinder block

Cylinder head

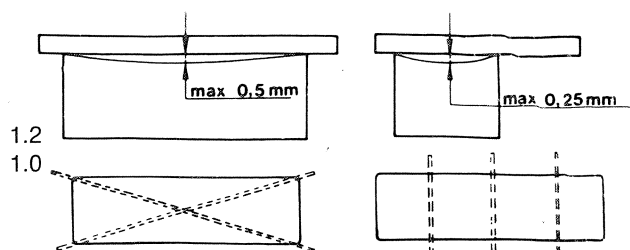
Height, new	146.1 mm
minimum height after refacing	145.6 mm



40 130

Maximum warp (see fig.)

Cylinder head gasket, thickness, unloaded mm
loaded mm



40 140

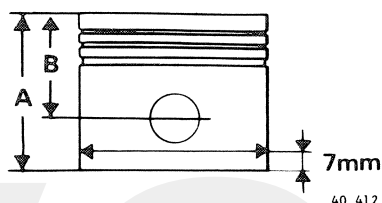
Cylinder block

Bore

Standard (marked C)	mm	88.90 - 88.91
(marked D)	mm	88.91 - 88.92
(marked E)	mm	88.92 - 88.93
(marked G)	mm	88.94 - 88.95
Oversize 1	mm	89.29 - 89.30
Oversize 2	mm	89.67 - 89.68

Cylinders should be rebored when wear reaches 0.10 mm (if the engine's oil consumption is abnormally high).

Pistons



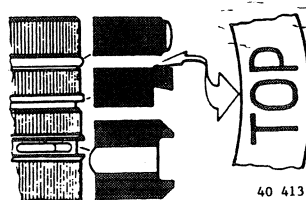
40 412

Engine type	B19A	B19A	B19E	B19A
Compression ratio	568, 854, 906, 982, 984 (9.2:1)	552, 566 660 (10:1)	554, 556 862, 864 (10:1)	902 (8.5:1)
Height, dimension A	71.5	73.9	73.9	71
dimension B	46.5	46.7	46.7	46
Weight	496 - 508	509 - 521	509 - 521	496
Max. permissible weight difference between any 2 pistons in same engine	12	12	12	12
Piston clearance (see note)	0.01 - 0.03	0.01 - 0.03	0.01 - 0.03	0.01 - 0.03

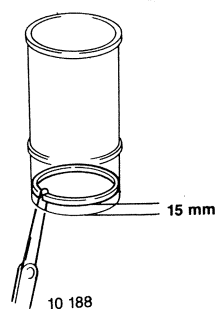
Note:

On the B19 engine the piston diameter is measured at right-angles to the gudgeon pin hole and 7 mm from the underside of the piston.

Piston rings



40 413



10 188

	Upper compression ring	Lower compression ring	Oil scraper ring
Height	1.728 - 1.740	1.978 - 1.990	3.978 - 3.990
Axial clearance (measured with compression ring on piston)	0.040 - 0.072	0.040 - 0.072	0.030 - 0.062
Ring gap (measured in cylinder, see illustration)	0.35 - 0.65	0.35 - 0.55	0.25 - 0.60

Gudgeon pin

Fit, in connecting rod	
in piston	
Diameter, standard	mm
oversize	mm

light thumb pressure (close running fit)
thumb pressure (push fit)
24.00
24.05

Valve system

Valve clearances

Inlet and exhaust valves:	
cold engine	mm
hot engine	mm
Shims, thickness	mm

When checking

0.30 - 0.40

0.35 - 0.45

3.30 - 4.50, increasing by increments of 0.05 mm

When adjusting

0.35 - 0.40

0.40 - 0.45

Valve stem diameter

inlet new	mm
min.	mm
exhaust new	mm
min.	mm

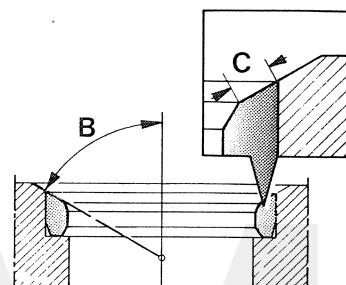
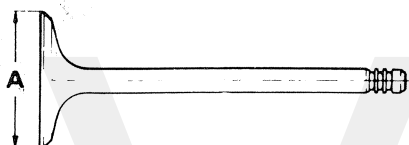
7.955 - 7.970

7.935

7.945 - 7.960

7.925

Valves



42 654

Engine type	Valves	Diameter (A)	Seat angle (B)	Seat width (C)
B19	inlet valve	44 mm	45°	1.6 ± 0.3 mm
	exhaust valve	35 mm	45°	2.0 ± 0.3 mm

Valve seats

Valve seat, diameter, standard	mm
oversize 1	mm
oversize 2	mm

Inlet

46.00

46.25

46.50

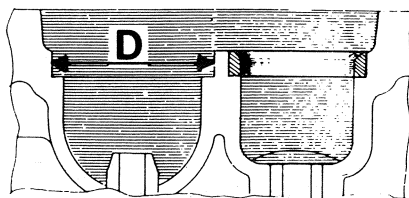
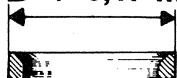
Exhaust

38.00

38.25

38.50

$D + 0,17 \text{ mm}$



40 416

Note: when replacing valve seats, there must be a negative clearance of 0.17 mm between the valve seat and the cylinder head recess, i.e. the valve seat diameter must be 0.17 mm larger than the diameter of the recess in the cylinder head.

Valve guides

Length	mm
Inside diameter	mm
Height above upper face of cylinder head	mm
Clearance, valve stem guide (measured with new valve), new	mm
maximum	mm

Inlet valve

52

8.000 - 8.022

15.4 - 15.6

0.030 - 0.060

0.15

Exhaust valve

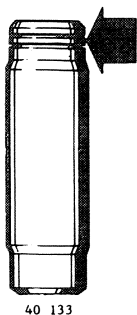
52

8.000 - 8.022

17.9 - 18.1

0.060 - 0.090

0.15



40 133

There are three oversizes of valve guides and these are marked with grooves.

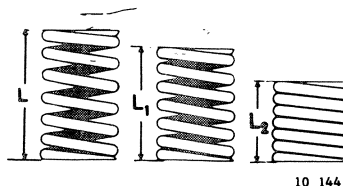
	Markings	Reamer for outside diameter of valve guide
Standard	No groove	—
Oversize 1	1 groove	5161
2	2 grooves	5162
3	3 grooves	5163

When pressing in a valve guide the force used must be at least 9000 N (900 kg). If the force used is less, ream out the bore for the next oversize and press in the corresponding size of valve guide.

Valve springs

Length under various loadings.

	Length	Loading
L	45 mm	0
L ₁	38 mm	280 - 320 N (28 - 32 kg)
L ₂	27 mm	710 - 790 N (71 - 79 kg)



10 144

Tappets

Diameter	mm	36.975 - 36.995
Height	mm	30 - 31
Clearance, shim-tappet	mm	0.009 - 0.064
tappet-cylinder head	mm	0.030 - 0.075

Shims (for valve clearance)

Thickness	mm	3.30 - 4.50, increasing by increments of 0.05
Diameter	mm	32.980 - 33.000

Timing gear

Camshaft

Markings		A or L (A: B19E/A: B19A up to '82/-L: B19A from '82)
Max. cam lift	mm	A: 10.5; L: 9.8
Camshaft journal diameter	mm	29.050 - 29.070
Bearing diameter	mm	30.000 - 30.021
Radial clearance,		
new	mm	0.030 - 0.071
max.	mm	0.15
End float	mm	0.1 - 0.4

Checking camshaft setting (cold engine)

With a valve clearance of 0.5 mm the inlet valve opens: 15° BTDC (L camshaft) and 22° BTDC (A camshaft).

Countershaft

	Bearing journal	Bearing in cylinder block
Diameter, front	mm	46.975 - 47.000
intermediate	mm	43.025 - 43.050
rear	mm	42.925 - 42.950
Radial clearance	mm	0.0200 - 0.0750
End float	mm	0.2000 - 0.4600

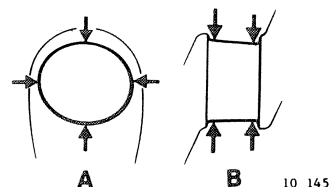
Crankshaft assembly

Crankshaft

Max. out-of-true	mm	0.05
Max. end float	mm	0.25
radial clearance (main bearings)	mm	0.028 - 0.083
Big-end bearings, axial clearance	mm	0.15 - 0.35
radial clearance	mm	0.024 - 0.070

Main bearing journals

Max. ovality (A)	mm	0.07
Max. taper (B)	mm	0.05
Diameter, standard	mm	63.451 - 63.464
undersize 1	mm	63.197 - 63.210
undersize 2	mm	62.943 - 62.956
Width on crankshaft for flange bearing shells:		
standard	mm	38.960 - 39.000
oversize 1	mm	39.061 - 39.101
oversize 2	mm	39.163 - 39.203



Big-end bearing journals

Max. ovality	mm	0.05
Max. taper	mm	0.05
Diameter, standard	mm	53.987 - 54.000
undersize 1	mm	53.733 - 53.746
undersize 2	mm	53.479 - 53.492
Bearing recess width	mm	29.95 - 30.05

Connecting rods

Axial clearance at crankshaft	mm	0.15 - 0.35
Length, centre-to-centre	mm	145 $\pm$ 0.1
Max. weight difference between con-rods in the same engine	grammes	10

Flywheel

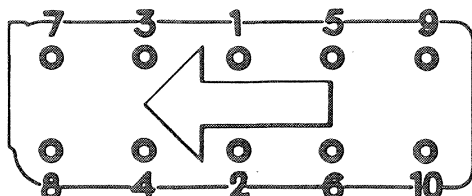
Max. axial throw, measured on diameter	0.05 mm/150 mm diameter
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Tightening torques

The tightening torques shown here apply to oiled bolts and nuts. Degreased (washed) components should be oiled before fitting.

	Nm
Cylinder head: tighten in stages; see page 39	
Main bearing caps	110
Big-end bearing caps, old bolts	63
new bolts	70
Flywheel (fit new bolts)	70
Camshaft sprockets	50
Countershaft sprockets	50
Camshaft bearing caps	20
Crankshaft pulley bolt (short)	165
Crankshaft pulley bolt (long)	250
Cooling fan bolt	9
Engine mounting pads (lock nuts)	45
Drain plug	25

Tightening sequence for cylinder head bolts



Tightening the cylinder head bolts

The cylinder head bolts should be tightened in the correct sequence and in stages.

Old type bolt:

1st stage: tighten to **60 Nm**.

2nd stage: tighten to **110 Nm**.

Run the engine warm for 20 minutes.

Allow the engine to cool down for approx. 30 minutes.

Slacken No. 1 cylinder head bolt a quarter-turn and then re-tighten to **110 Nm**.

Repeat this in the correct sequence for the remaining bolts.

New type bolt:

1st stage: tighten to **20 Nm**.

2nd stage: tighten to **60 Nm**.

3rd stage: tighten a further quarter-turn.

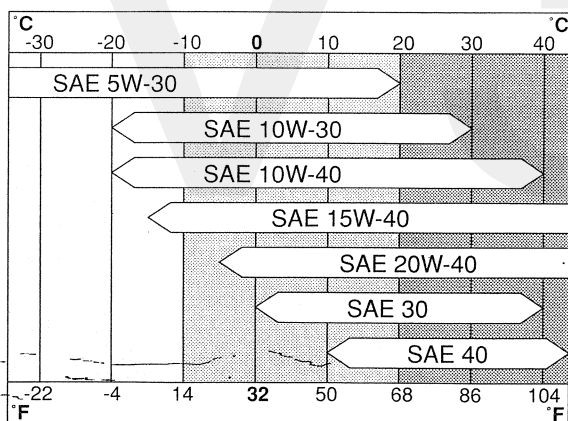
Note: there is no need to run the engine warm.

Group 22 Lubricating system

General data

Oil capacity, excl. oil filter	litre	4.0
incl. oil filter	litre	4.5
Difference between max.- min.	litre	1.0
Oil pressure at 33 r/s (2000 r/min), with hot engine and new oil filter	MPa (kg/cm ²)	0.25 - 0.60 (2.5 - 6.0)
Engine oil, type and quality		CCMC Service classification: G2 or G3 API Service classification: SF.

Viscosity Temperature range (stable ambient temperature)



Under extreme driving conditions which can result in an abnormally high oil temperature and higher oil consumption, such as when driving in mountainous areas with frequent braking on the engine and in the case of high-speed driving on motorways, SAE 15W/40 or SAE 20W/40 oil is recommended, but always bear in mind the lowest temperature limit.

Carburettor

Oil for damping cylinder

ATF

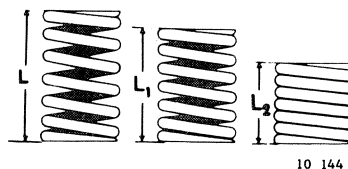
Oil pump

Axial clearance	mm	0.02 - 0.12
Radial clearance (excl. bearing clearance)	mm	0.02 - 0.09
Backlash (excl. bearing clearance)	mm	0.15 - 0.35
Bearing clearance, drive shaft	mm	0.024 - 0.049
idler shaft	mm	0.013 - 0.037

Relief valve spring

Length under various loadings

	Length	Loading
L	39.2 mm	0
L1	26.25 mm	46 - 54 N
L2	21.0 mm	62 - 78 N



Group 23 Fuel system

CO% at idling speed (hot engine)

Engine type	CO-percentage*		Idling speed	
	Setting value	Control value	r/s	r/min
B19A 568, 854, 906, 982, 984 902	2.0	1.5 - 3.0	15 ± 0.8	900 ± 50
B19A 552, 566, 658, 660	1.5	1.0 - 2.5	15 ± 0.8	900 ± 50
B19E 554, 556, 862, 864	1.0	0.5 - 2	15 ± 0.8	900 ± 50

- * — Engines **outside** the control values must be adjusted to the specified setting.
Engines **within** the control values need no further adjustment, providing the engine is running satisfactorily.
— Pulsair system (if fitted) disconnected and blanked off.

Fuel tank

Total capacity	litre	57
Reserve capacity (warning lamp in fuel gauge)	litre	5

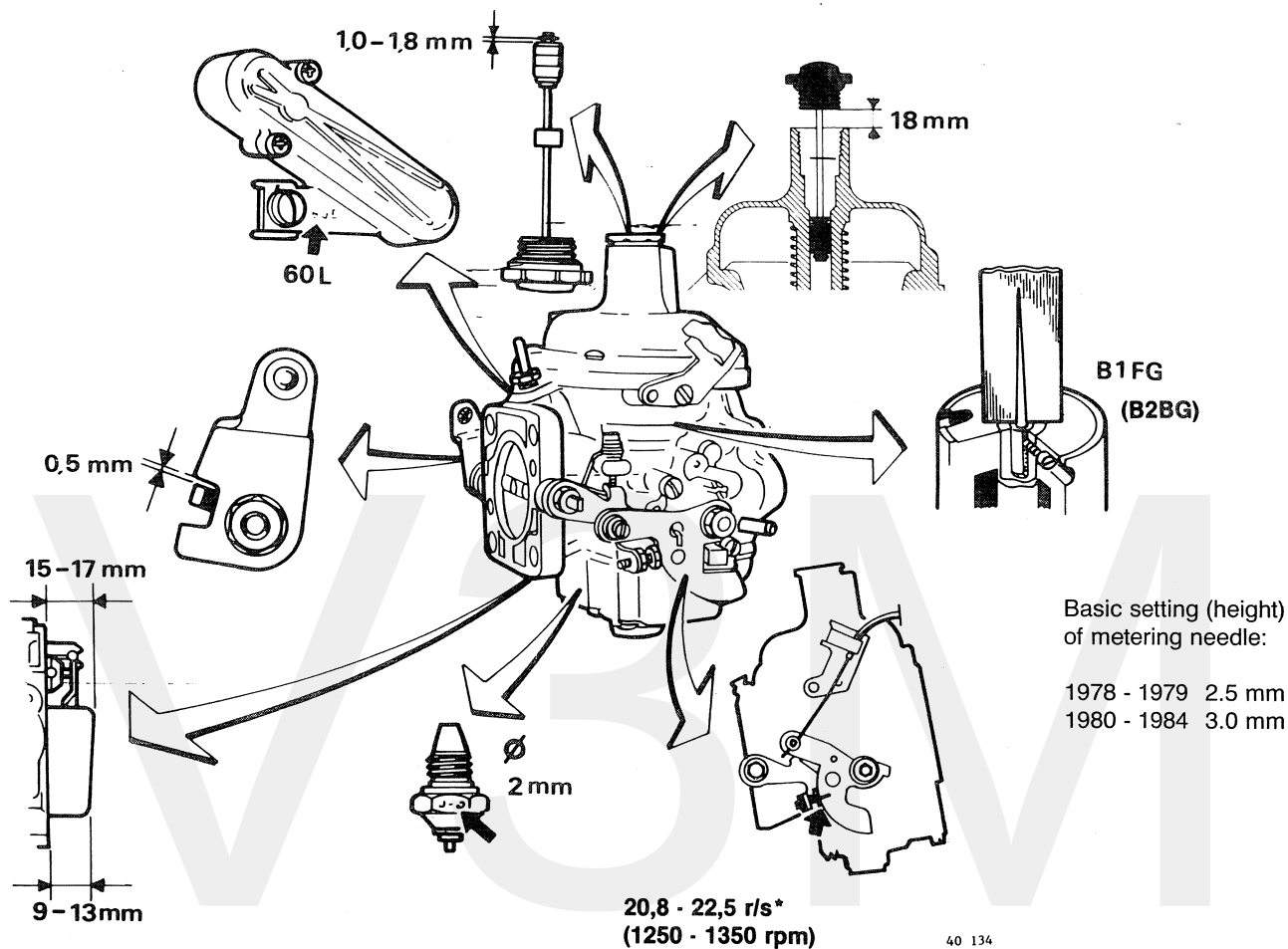
Fuel system, carburettor engines

Carburettor

Make and type

Zenith 175 CD-2SE

Specifications



*Fast idle with hot engine and with dipped beam headlights on.

Air supply

Type of system
Control range °C

thermostatic
20 - 30

Dashpot setting

Screw the dashpot back until, with the dashpot piston pressed in fully and the roller against the stop, the specified setting of 0.5 ± 0.1 mm is obtained

Fuel pump

Delivery pressure, measured at same height as pump,
at 16,6 r/s (1000 r/min) kPa (kg/cm²)

B19A

15 - 27 (0.15 - 0.27)

Fuel system, injection engine

Make and type

Bosch LE-jetronic

Auxiliary air valve

Resistance 40 - 60 ohms

Fully open at -30°C

Fully closed at $+70^{\circ}\text{C}$

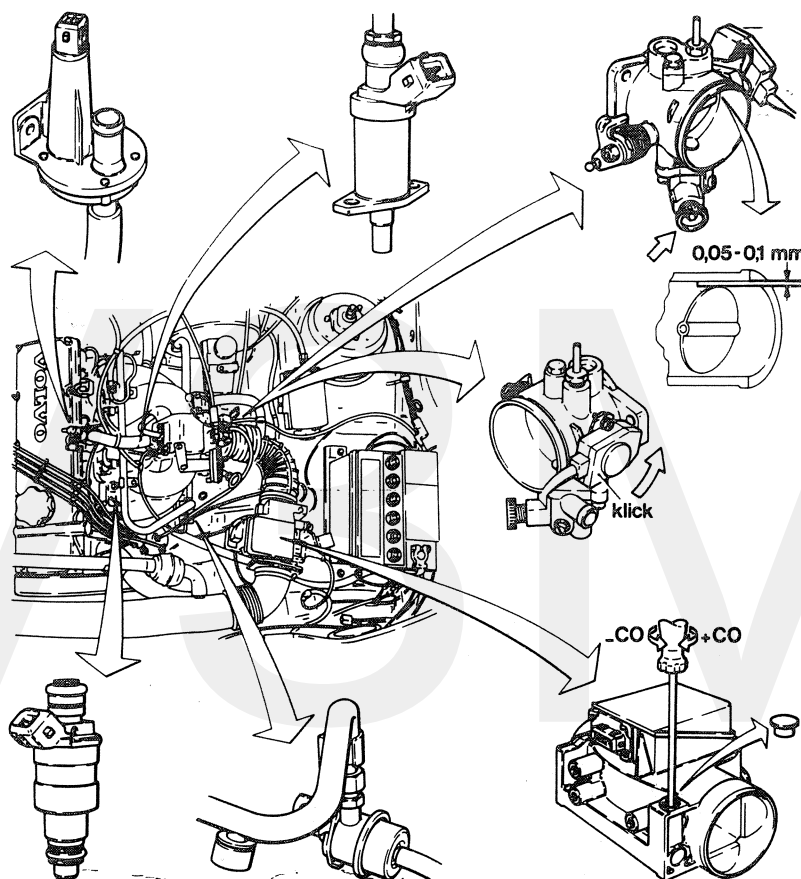
The auxiliary air valve is electrically operated and should be fully closed within 5 minutes after starting at an ambient temperature of 20°C

Cold-start injector

Injection time decreasing from 7 s at -20°C to 0 s at $+35^{\circ}\text{C}$.

Idle adjusting screw

Idling speed 15 r/s (900 r/min)



Fuel injector

Resistance at 20°C ... 15 - 17.5 ohms

Resistance at 80°C ... 17 - 19 ohms

Potential difference across the points: immediately after starting 1V

after a short time 0.6V

hot engine 0.4V

Injection pressure regulator

Line pressure (2.5 kg/cm^2) ... 250 kPa

Residual pressure ($2.3 - 2.4 \text{ kg/cm}^2$)

..... 230 - 240 kPa

Air flow (volume) meter

CO value, when adjusting 1.0%
when checking 0.5 - 2.0%

Resistance:

between terminals 8 and E:

..... 150 ohms

between terminals 9 and E:

..... 50 ohms (20°C)

between terminals 5 and 7: varying from min. 100 ohms to max. 1000 ohms, depending upon the position of the valve.

Air supply

Type of system thermostatic

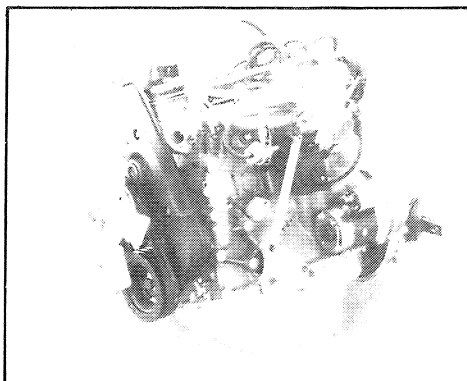
Control range $25 - 35^{\circ}\text{C}$

Fuel pump

Capacity at 250 kPa (2.5 kg/cm^2),

12V and $+20^{\circ}\text{C}$ 120 litres/h; 1.0 litre/30 s

Current rating 6.5 A

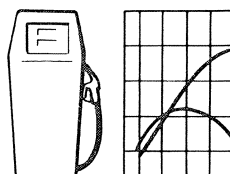


B200 Engine

Group 20 General data	Page 43
Group 21 Cylinder block	44
Group 22 Lubricating system	48
Group 23 Fuel system	49

Group 20 General data

Compression ratio, fuel octane requirements, output, torque



10 138

Engine	Compression ratio		Fuel octane	Output, ISO		Max. torque, ISO
				kW at r/s	hp at r/min	Nm at r/s
B200K						
Nordic/Europe	-87	10.0:1	98	75/95	102/5700	157/50
Overseas 928	87-	10.0:1	95 (lead-free)			
		9.2:1	92	75/95	98/5700	157/50
B200E						
Nordic/Europe	-87	10.0:1	98	85/95	116/5700	160/70
	87-	9.2:1	91 (lead-free)	82/97	112/5800	157/70
Overseas		9.2:1	92	82/97	112/5800	157/70
B200EA						
Nordic/Europe		9.2:1	91 (lead-free)	82/97	112/5800	157/70
Australia (OXYCAT)		9.2:1	91 (lead-free)	80/100	109/6000	150/70
B200F		9.2:1	91 (lead-free)	80/100	109/6000	150/70

Due to standardization the engine output is now indicated by ISO standards (this standard is approx. 1 to 2% lower than the DIN standard).

Other general data

Number of cylinders	4
Bore	88.9 mm
Stroke	80 mm
Displacement	1.986 dm ³ (litre)
(No. 1 cylinder at timing gear end)	1 - 3 - 4 - 2
Final compression	
(normal pressure, see note)	0.9 - 1.1 (9 - 11) MPa (kg/cm ²)

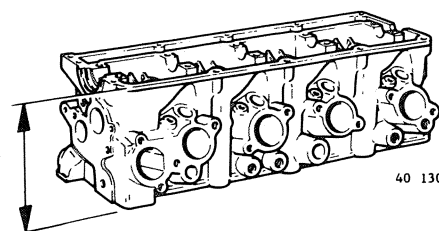
Note:

Compression measured with hot engine, fully opened throttle valve and with engine turned over by starter motor.

Group 21 Cylinder block

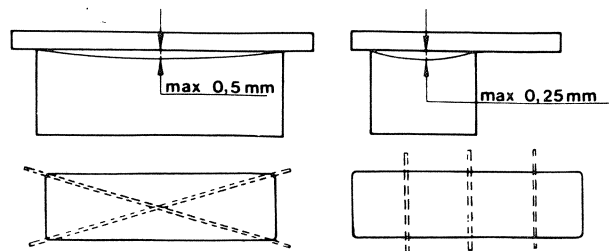
Cylinder head

Height, new: mm 146.1
minimum height after refacing mm 145.6



40 130

Maximum warp (see fig.)



Cylinder head gasket, thickness,
unloaded mm 1.3
loaded (compressed) mm 1.2

40 140

Cylinder block

Bore

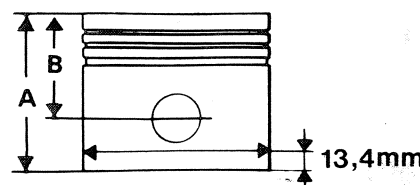
Standaard (marked C) mm 88.90-88.91
(marked D) mm 88.91-88.92
(marked E) mm 88.92-88.93
(marked G) mm 88.94-88.95
Oversize 1 mm 88.29
Oversize 2 mm 89.67

Cylinders should be rebored when wear reaches 0.10 mm (if the engine's oil consumption is abnormally high).

Pistons

Diameters

Standard, class C mm 88.88 - 88.89
Standard, class D mm 88.89 - 88.90
Standard, class E mm 88.90 - 88.91
Standard, class G mm 88.92 - 88.93
Oversize 1 mm 89.27 - 89.28
Oversize 2 mm 89.65 - 89.66



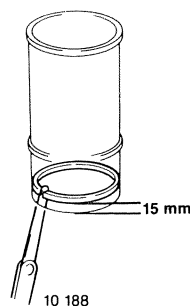
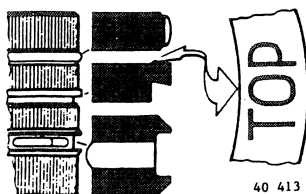
40 412

B200K/O **B200E/E-E/S-K/S**
928, 938 EO **622, 624, 626, 628**
EA 942, F 778

Compression ratio	9.2:1	10.0:1
Height, dimension A mm	67.7	69.9
dimension B mm	39.7	41.9
Weight (tolerance) grammes	440 (± 8)	440 (± 8)
Max. permissible weight difference between any 2 pistons in same engine grammes	16	16
Max. piston clearance (see note) — 1985 mm	0.03 - 0.027	0.03 - 0.027
Max. piston clearance 1986 — mm	0.01 - 0.03	0.01 - 0.03

Note: The piston diameter is measured at right-angles to the gudgeon pin hole and 13.4 mm from the underside of the piston; for the method of measuring the clearance see the Service manual.

Piston rings



Height mm
Axial clearance (measured with compression ring on piston) mm
Ring gap (measured in cylinder, see illustration) mm

Upper compression ring
1.728 - 1.740

Lower compression ring
1.728 - 1.740

Oil scraper ring
3.475 - 3.490

0.060 - 0.092

0.030 - 0.062

0.020 - 0.055

0.30 - 0.50

0.30 - 0.55

0.25 - 0.50

Gudgeon pin

Fit, in connecting rod
in piston
Diameter, standard mm
oversize mm
length mm

light thumb pressure (close sliding fit)
thumb pressure (sliding fit)
23.00
23.05
60

Valve system

Valve clearances

Inlet and exhaust valves:
cold engine mm
hot engine mm
Shims, thickness mm

When checking

0.30 - 0.40

0.35 - 0.45

3.30 - 4.50 increasing by increments of 0.05 mm

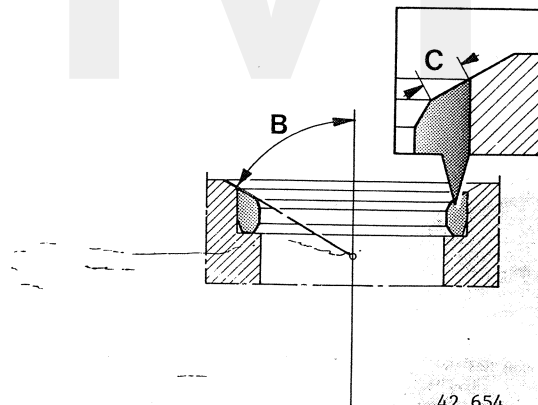
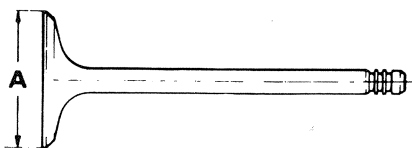
When adjusting

0.35 - 0.40

0.40 - 0.45

Valves

Special note: the exhaust valves are coated with Stellite steel and therefore cannot be machined. They can, however, be ground with grinding paste to obtain a gastight seal.



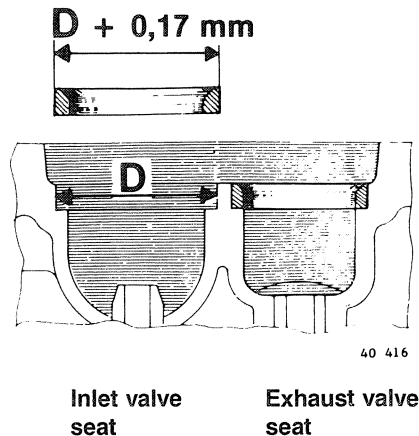
42 654

Engine type	Valves	Diameter (A)	Seat angle (B)	Seat width (C)
B200	inlet valve	44 mm	45°	1.6 ± 0.3 mm
	exhaust valve	35 mm	45°	2.0 ± 0.3 mm

Valve seats

Valve seat, diameter, standard	mm
oversize 1	mm
oversize 2	mm

Inlet	Exhaust
46.00	38.00
46.25	38.25
46.50	38.50



Note: when renewing valve seats, there must be a clearance of 0.17 mm between the valve seat and the cylinder head recess, i.e. the valve seat diameter must be 0.17 mm larger than the diameter of the recess in the cylinder head.

Valve guides

Length	mm
Inside diameter	mm
Height above upper face of cylinder head	mm
Clearance, valve stem guide (measured with new valve), new	mm
maximum	mm

Inlet valve	Exhaust valve
52	52
8.000 - 8.022	8.000 - 8.022
15.4 - 15.6	17.9 - 18.1
0.030 - 0.060	0.060 - 0.090
0.15	0.15



There are three oversizes of valve guides and these are marked with grooves.

Markings	Reamer for outside diameter of valve guide
Standard	—
Oversize 1	1 groove 5161
2	2 grooves 5162
3	3 grooves 5163

When pressing in a valve guide the force used must be at least 9000 N (900 kg). If the force used is less, ream out the bore for the next oversize and press in the corresponding size of valve guide.

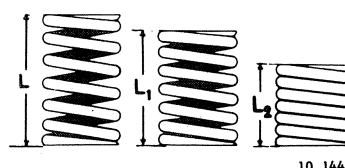
Valve springs

Length under various loadings.
Outside diameter: 32.5

Length	Loading
L 45 mm	0
L ₁ 38 mm	280 - 320 N
L ₂ 27 mm	710 - 790 N

Outside diameter: 25.9

Length	Loading
L 45.5 mm	0
L ₁ 38 mm	280 - 320 N
L ₂ 27.5 mm	702 - 782 N



Tappets

Diameter	mm	36.975 - 36.995
Height	mm	30 - 31
Clearance, shim-tappet	mm	0.009 - 0.064
tappet-cylinder head	mm	0.030 - 0.075

Shims (for valve clearance)

Thickness	mm	3.30 - 4.50 increasing by increments of 0.05 mm
Diameter	mm	32.980 - 33.0

Timing gear

Engine type	Camshaft shape	Max. lift height	Control values valve (with cold engine) valve clearance No.1 inlet valve	inlet valve opens at
B200 K (Europa)	L	9.8 mm	0.7mm	5° BTDC
B200 K (Nordic + overseas)	Y	10.35 mm	0.7mm	8° BTDC
B200 E	A	10.50 mm	0.7mm	13° BTDC
B200 F	M	Inlet 9.5 mm Exhaust 10.5 mm	0.7mm	6° BTDC 44° BBDC

General data

Markings		marked A, L, M or Y
Camshaft journal diameter	mm	29.050 - 29.070
Radial clearance,		
new	mm	0.030 - 0.071
max.	mm	0.15
End float	mm	0.20 - 0.50
Camshaft bearing diameter	mm	30.000 - 30.021

Countershaft

Diameter, front	mm	46.975 - 47.000
intermediate	mm	43.025 - 43.050
rear	mm	42.925 - 42.950
Radial clearance	mm	0.020 - 0.075
End float	mm	0.20 - 0.46

Crankshaft

Max. out-of-true	mm	0.025
Crankshaft, max. end float	mm	0.08 - 0.270
radial clearance (main bearings), old	mm	0.024 - 0.072
radial bearings (main bearings), new	mm	0.024 - 0.061
Big-end bearings, axial clearance	mm	0.15 - 0.35
radial clearance	mm	0.023 - 0.067

Main bearing journals

Max. ovality (A)	mm	0.004
Max. taper (B)	mm	0.004

Diameter, standard	mm	54.987 - 55.000
undersize 1	mm	54.737 - 54.750
undersize 2	mm	54.487 - 54.500
Bearing recess, width	mm	22.9 - 25.1

Width on crankshaft for flange bearing shells:

standard	mm	31.960 - 32.000
oversize 1	mm	32.210 - 32.250
oversize 2	mm	32.460 - 32.500

Special note: different types of main bearings are used, so **always** use the same type of bearing at top and bottom! The upper and lower main bearing shell on the same journal must be of the same make.

Big-end bearing journals

Max. ovality	mm	0.004
Max. taper	mm	0.004
Diameter, standard	mm	48.984 - 49.005
undersize 1	mm	48.734 - 48.755
undersize 2	mm	48.484 - 48.505
Bearing recess, width	mm	23.9 - 26.1

One of the following alternatives is used:

Alt. 1: two bearing shells colour-coded yellow

Alt. 2: one bearing shell colour-coded blue (in the connecting rod) and one colour-coded red (in the bearing cap).

Only yellow colour-coded bearing shells are supplied for Service purposes.

Bearing journal

47.020 - 47.050
43.070 - 43.100
42.970 - 43.000

Bearing in cylinder block

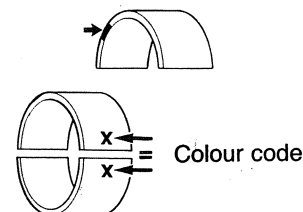
47.020 - 47.050
43.070 - 43.100
42.970 - 43.000

Old variant

54.987 - 55.000
54.737 - 54.750
54.487 - 54.500
22.9 - 25.1

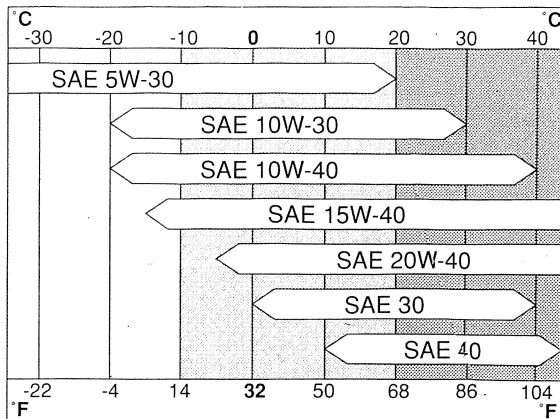
New variant

62.987 - 63.000
62.737 - 62.750
62.487 - 62.500



42 656

Viscosity Temperature range (stable ambient temperature)



Under extreme driving conditions which can result in an abnormally high oil temperature and higher oil consumption, such as when driving in mountainous areas with frequent braking on the engine or high-speed motorway driving, the recommended oils are SAE 15W/40 or SAE 20W/40, but always bear in mind the lowest temperature limit.

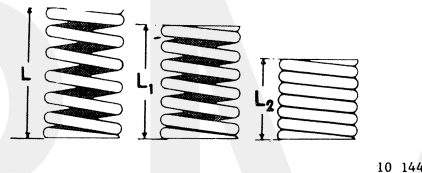
Oil pump

Axial clearance	mm	0.02 - 0.12
Radial clearance (excl. bearing clearance)	mm	0.02 - 0.09
Backlash (excl. bearing clearance)	mm	0.15 - 0.35
Bearing clearance, drive shaft	mm	0.032 - 0.070
idler shaft	mm	0.014 - 0.043

Relief valve spring

Length under various loadings

	Length	Loading
L	39.20 mm	0
L1	26.25 mm	46 - 54 N
L2	21.00 mm	62 - 78 N



Group 23 Fuel system

CO% at idling speed (hot engine)

Engine type	CO-percentage*		Idling speed	
	Setting value	Control value	r/s $\pm$ 0.8	r/min $\pm$ 50
B200K, B200K(D)	1.5	1.0 - 2.5	15.0	900
B200E/B200EA/B200ES	1.0	0.5 - 2.0	15.0	900
B200F**	0.6	0.4 - 0.8	15	900
B200EO (oxy-cat)***	1.0	0.5 - 2.0	15.0	900

* Pulsair system (if fitted) must be disconnected

* Lambda probe disconnected and measured ahead of the catalytic converter

(after connecting up the Lambda sensor the CO-level and the engine speed must remain unchanged)

*** Measured ahead of the catalytic converter.

Fuel tank

Total capacity	litre	57
Reserve capacity (warning lamp in fuel gauge)	litre	5

Oil pump

Axial clearance	mm	0.02 - 0.08
Max. clearance between gears and pump body (backlash)	mm	0.10 - 0.24
Bearing clearance, drive shaft	mm	0.024 - 0.049

Fuel pump

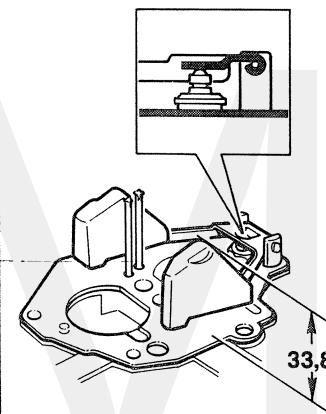
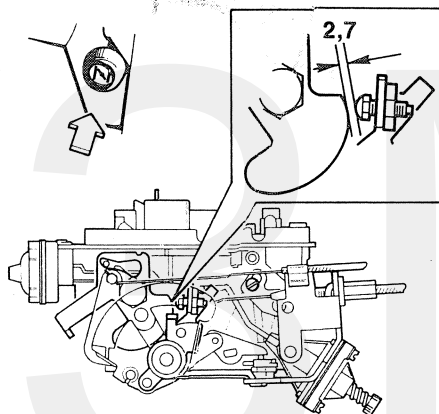
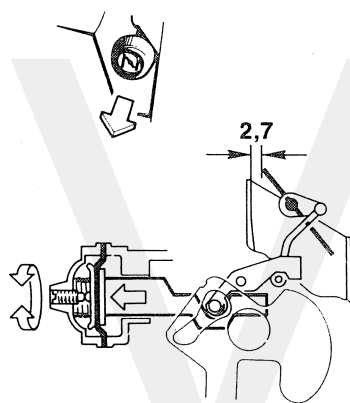
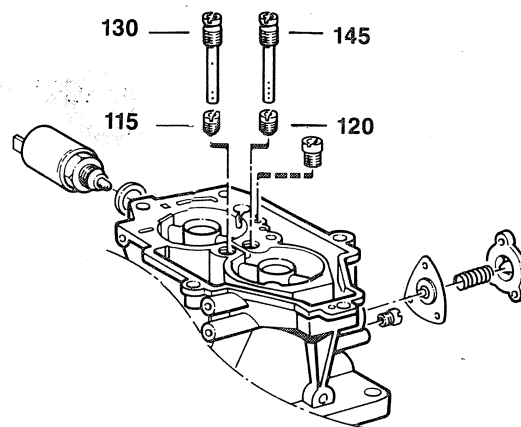
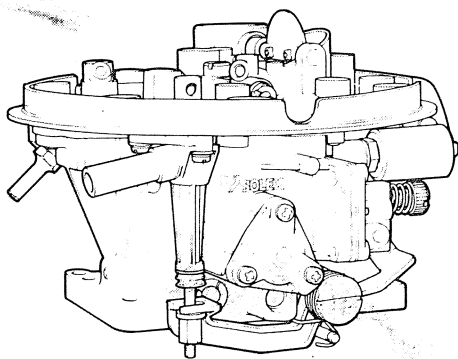
Delivery pressure, measured at same height as pump, at 16.6 r/s (1000 r/min)	kPa (kg/cm ²)	B200K 15 - 27 (0.15 - 0.27)
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Carburettor

Make and type

Solex 34 - 34 CISAC

Specifications



41 980

Solex 34-34 CISAC	1st stage	2nd stage
Venturi diameter	15	27
Main jet (fuel)	120	115
(air)	145	130
Emulsion tube	ZN	ZC
Idle jet (fuel)	44	60
(air)	100	100
Accelerator pump injector	60	—
Needle valve		2.1
Float weight		6.11
Float height (measured with gasket)		22.5

Decelerating mechanism, specified speed
(for Switzerland and Sweden)

r/s
25.0 - 28.3

r/min
1650 ± 50

Air supply

Type of system
Control range, °C

thermostatic
20 - 30

Fuel system, injection engine

Make and type

Bosch LE-jetronic (B200 F= LV - jetronic)*

* LU-Jetronic has Lambda control.

Auxiliary air valve

Resistance 40 - 60 ohms

Fully open at -30°C

Fully closed at $+70^{\circ}\text{C}$

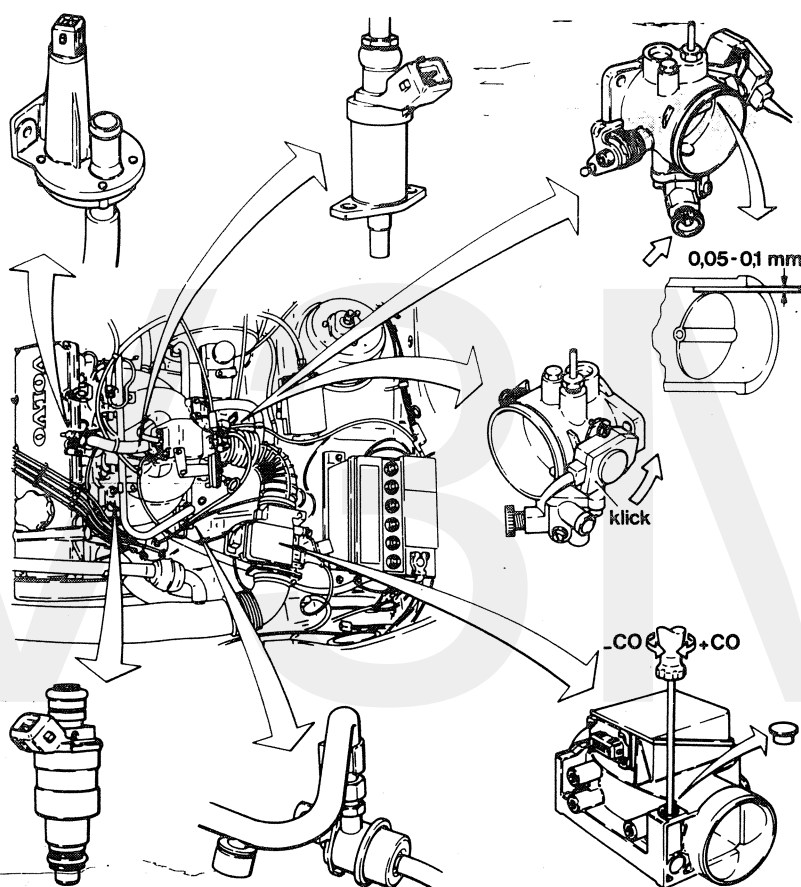
The auxiliary air valve is electrically operated and should be fully closed within 5 minutes after starting at an ambient temperature of $+20^{\circ}\text{C}$

Cold-start injector

Injection time decreasing from 7 s at -20°C to 0 s at $+35^{\circ}\text{C}$.

Idle adjusting screw

Idling speed 15 r/s (900 r/min)



Fuel injector

Resistance at $+20^{\circ}\text{C}$ 15 - 17.5 ohms

Resistance at $+80^{\circ}\text{C}$ 17 - 19 ohms

Potential difference across the points:
immediately after starting 1V

after a short time 0.6V

hot engine 0.4V

Injection pressure regulator

Line pressure (2.5 kg/cm²) ... 250 kPa

Residual pressure (2.3 - 2.4 kg/cm²)

..... 230 - 240 kPa

Air flow (volume) meter

Resistance:

between terminals 8 and E: 150 ohms
between terminals

9 and E 50 ohms ($+20^{\circ}\text{C}$)

between terminals 5 and 7: varying

from min. 100 ohms (approx) to max.

1000 ohms, depending upon the position

of the valve.

Air supply

Type of system thermostatic

Control range $25 - 35^{\circ}\text{C}$

Oxygen sensor

Potential difference across the

points mV 300 - 600

Tightening torque Nm 50.

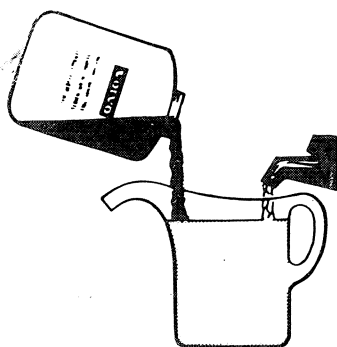
Fuel pump

Capacity at 250 kPa (2.5 kg/cm²),

12V and $+20^{\circ}\text{C}$ 1.0l/30 sec. (120 l/h)

Current rating 6.5 A

Group 26 Cooling system



40 095

Coolant mixture

General data

Coolant composition

- The coolant should be changed every second autumn. After this period the corrosion-protective additives will have lost some of their effect.
- Never fill the cooling system with water alone. Use genuine Volvo coolant diluted with clean water in the proportions shown below.

Nordic countries:

1 part Volvo coolant to 1 part water.

Europe and Overseas, with the exception of Nordic countries

1 part Volvo coolant to 2 parts water.

CKD countries: mixing ratio: 1 part coolant to 30 parts water

Capacity of cooling system

	B14	D16	B172K	B19	B200
up to 1980 litre	5.5	—	—	8.0	—
from 1980 litre	5.2**	7.0	6.5	8.0*	7.0

* from 1982: 7.0 litres

** from 1985: 6.5 litres

Expansion tank

The pressure valve in the filler cap opens at:	B14	D16	B172K	B19	B200
overpressure kPa (kg/cm ²)	75 (0.75)	100 (1.0)	75 (0.75)	75 (0.75)	75 (0.75)
underpressure kPa (kg/cm ²)	7 (0.07)	7 (0.07)	7 (0.07)	7 (0.07)	7 (0.07)

Thermostat

	B14	B14.40	D16	B172K	B19	B200
Type	1 2	1	1 2	1 2	1	1 2
Markings	89 92	83	89R V1053	V D	92	87 92
Starts to open at °C	86-89 89-92	80-83	89 80	89 89	91-93	86-88 91-93
Fully open at °C	100 105	93	102 101	101 101	102	97 102

V = Vernet

D = Dauphinoise

Viscous coupling cooling fan, B19/B200 (temperature-sensitive)

Starts to engage at 55°C*

Fully engaged at 70°C*

* air temperature ahead of cooling fan

Thermal switch, engine cooling fan

Type	
Engaging temperature °C	
Disengaging temperature °C	

B13,B14,D16

270 F

87.5 ± 2

82.5 ± 2

B172

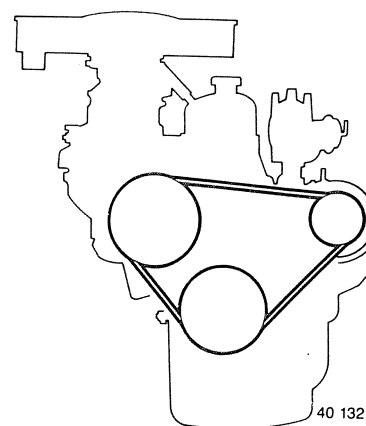
299F

65 ± 2

60 ± 2

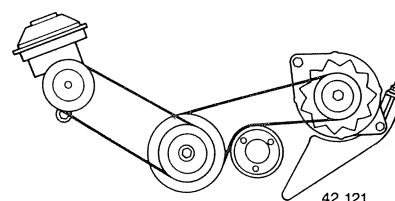
Fan belts

B14 DA-95-1215 LA up to '81
B14 AV-10-1235 LA from '82
B14, air conditioning A13/12.5 875 LA

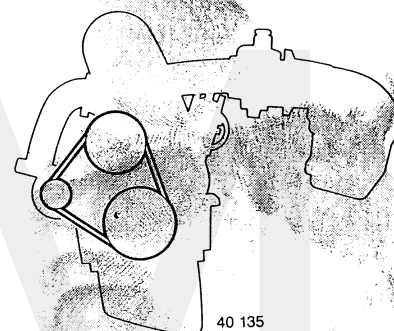


D16 Poly V-belt V884 K4T
Vacuum pump AV 10 755 LA

B172K Poly V-belt 5 PK 847



B19/B200 HC 38-925, HC co9 x 913
Power-assisted steering HC 38 co9 x 937



Poly V-belt

	Minimum value when checking	Adjusting value, used belt	Adjusting value, new belt
D16, B172K	25 kg*	40 kg	55 kg

* If the Poly V-belt tension falls below this value it should be adjusted to the 'used belt' adjusting value.

Note: The adjusting tool 9660 is calibrated in kg.

Tightening torques

The tightening torques shown here apply to oiled bolts and nuts. Degreased (washed) components should be oiled before fitting.

	B14/B13	D16	B172K	B19/B200
Radiator Nm	20	10	20	10
Temp. transmitter Nm	20	20	20	20
B200/B19				
Self-locking bolt for fixed cooling fan, front Nm	9			
Viscous coupling cooling fan, transmitter Nm	15			

Group 28 Ignition system

General data

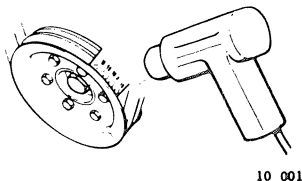
Note:

With effect from model year 1984 the **B14** and **B19A** engines are equipped with a "Renix" electronic ignition system. The specifications of this system are totally different to other existing systems. For this reason any data specific to this system are shown separately.

The electronic ignition on these engines cannot be adjusted; all values shown are given only for checking purposes.

Firing order 1-3-4-2

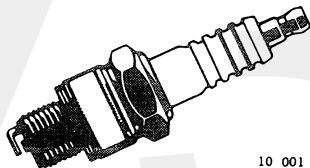
Ignition timing



10 001

Engine type	B14.0E/S	B14.1/2/3S B14.1/2E	B14.3E 1984	B172K	B19A 982, 984, 568	B19A, B19AS - '83 566, 552	B19E, B19AE '83- 566, 554
Degrees BTDC	$3^{\circ} \pm 1^{\circ}$	$6^{\circ} \pm 1^{\circ}$	$10^{\circ} \pm 1^{\circ}$	$6^{\circ} \pm 1^{\circ}$	$10^{\circ} \pm 2^{\circ}$	$7^{\circ} \pm 2^{\circ}$	$10^{\circ} \pm 2^{\circ}$

Spark plugs



10 001

Engine type	Model year	Set no.
B13.4E	89 -	3344473 - 8
B14.OE/OS	- 79	271412 - 9
B14.1E/1S	80 - 83	273597 - 5
B14.2E/2S	80 - 83	273597 - 5
B14.3E/3S	80 - 83	273597 - 5
B14.3E	84 - 86	271409 - 5
B14.4E/4O/4S	84 - 86	271409 - 5
B14.4E/4O/4S	87 -	3344473 - 8
B14.4ED	88 -	3344473 - 8
B172K (10:1)	85 - 86	271415 - 2
B172K (9.5:1)	87 -	3344473 - 8
B19A (CH - 810500)	80 - 83	273597 - 5
B19A (CH 810501 -)	84 -	271409 - 5
B19E	82 -	271415 - 2
B200EA/EE/EO/ES	85 -	271415 - 2
B200F	85 -	271415 - 2
B200F/ (CH/S)	85 -	3344311 - 0
B200KE/KO/KS/KD	85 -	271409 - 5

Electrode gap mm
Tightening torque Nm
(screw thread not oiled)

B14, B13	B172	b19A, B19E, B200
0.7	0.7	0.7
18	30	25

Distributor

Engine type

B14.0E
B14.0S
B14.1E/1S/2S
B14.2E/3S
B14.3E
B14.4E/S/O
B172K
B19A up to 1984
B19A from 1984
B19E
B200E/K

Distributor

Ducellier 6623
Ducellier 6624
Ducellier 525182*
Ducellier 525295
Ducellier 525351A
Ducellier 525352
Ducellier
Bosch JFU 4
Bosch JV 4
Bosch JHFU 4
Bosch JV 4

Type

with breaker points
with breaker points
with breaker points
with breaker points
with breaker points
breakerless**
breakerless**
with breaker points
breakerless**
breakerless, working on "Hall-effect" principle
breakerless,**

Direction of rotation
Breaker point gap mm
Dwell angle at 8.3 r/s (500 r/min)

B14

clockwise
0.4 - 0.5***
57° ± 3°****

B19A

clockwise
min. 0.4
62° ± 3°

B19E

clockwise
not applicable
62° ± 3°

* B14.1E: 488547-516644 with AC Delco

** Dwell angle cannot be checked or adjusted (electronically controlled)

*** SEV Marchal: only dwell angle can be adjusted

**** AC Delco: 50° ± 3°

Centrifugal control (vacuum hose disconnected)*

Advance in distributor degrees	B14.0	B14.1/2/3S	B14.3E	B19A up to 1984	B19E
Total advance, distributor degrees	15 ± 1	12 ± 1	10 ± 1	12.5 ± 1	12.0 ± 1
Advance begins at a distributor speed of r/s	9.2	10	12.5	6.7 - 10	6.6 - 10
..... r/min	550	600	750	400 - 600	400 - 600

* Does not apply to B14 and B19A engines of model year 1984 (see page 55)

Distributor speeds for degrees of advance beyond static position

	B14.0	B14.1/2/3S	B14.3E	B19A 854, 906, 982, 984, 902 up to 1984	B19A 552, 556 up to 1984	B19E
5° r/s	14.3	17.5	19	13 - 14.3	13.3 - 17.5	15.8 - 21.7
r/min	860	1050	1150	780 - 860	800 - 1050	950 - 1300
7° r/s	—	—	—	—	16.7 - 20	—
r/min	—	—	—	—	1000 - 1200	—
9° r/s	25.3	28.3	30	—	—	—
r/min	1520	1700	1800	—	—	—
10° r/s	—	—	—	19.2 - 23.3	25 - 35	26.6 - 32.5
max. r/s	41.6	45.8	33.3	25	41.7	33.3
r/min	2500	2750	2000	1500	2500	2000

Vacuum control

Advance in distributor degrees

Direction of adjustment: positive

Note:

When checking the undermentioned values on the engine, they have to be doubled and then added to the static setting value in order to convert from distributor degrees to engine degrees. This applies to both centrifugal and vacuum advance.



10 001

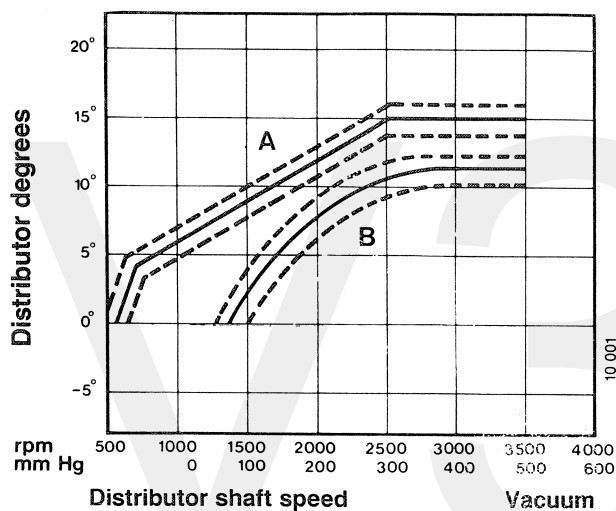
	B14.0E	B14.0S	B14.1/2S	B14.2E/3S	B14.3E up to 1984	B19A up to 1984	B19E
Total advance, distributor degrees	11	9.3	7.5	9.3	10	7.5	8
Advance begins at mm Hg	80	25	125	80	80	130	170
2° advance at mm Hg	100	30	145	100	110	152	195
5° advance at mm Hg	—	—	—	150	170	190	240
Max. advance at bij mm Hg	370	52	400	350	320	220	280

*Does not apply to B14 and B19A engines of model year 1984 (see page 55)

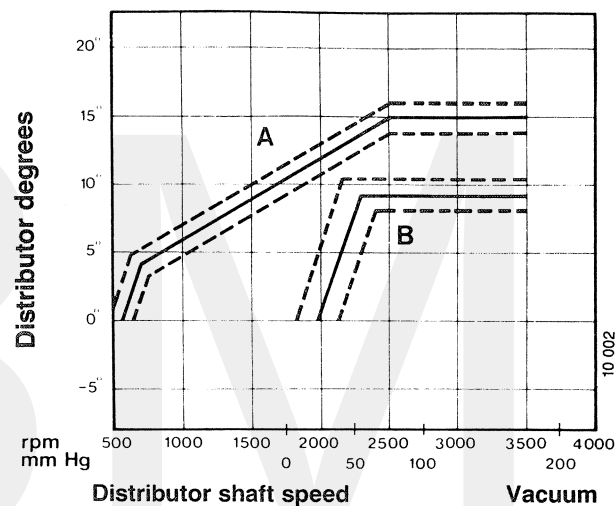
Ignition setting graphs

A = centrifugal advance
B = vacuum advance

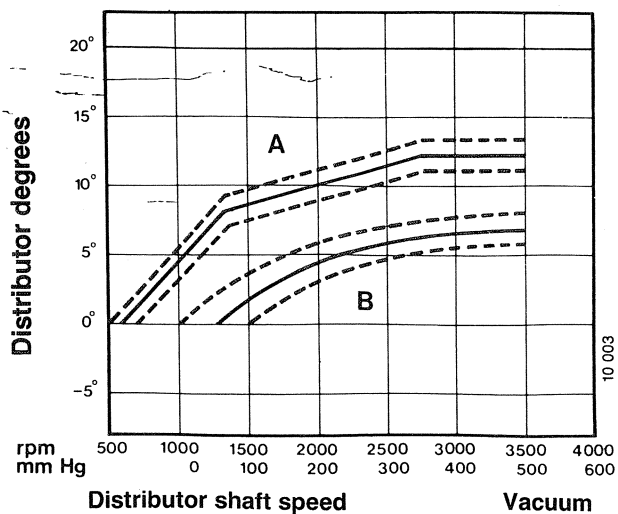
B14.0E



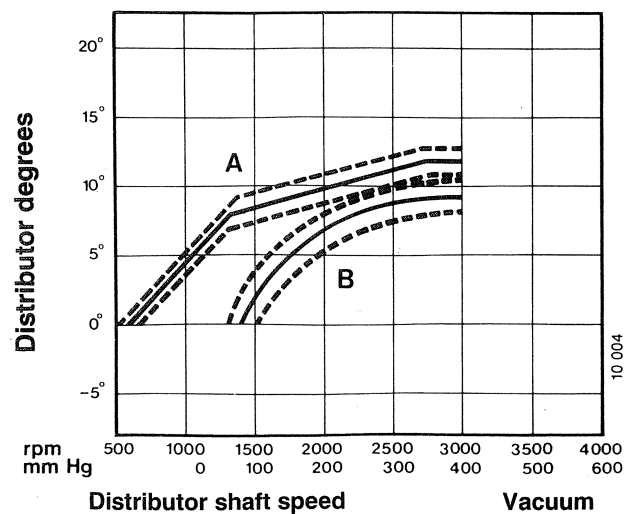
B14.0S



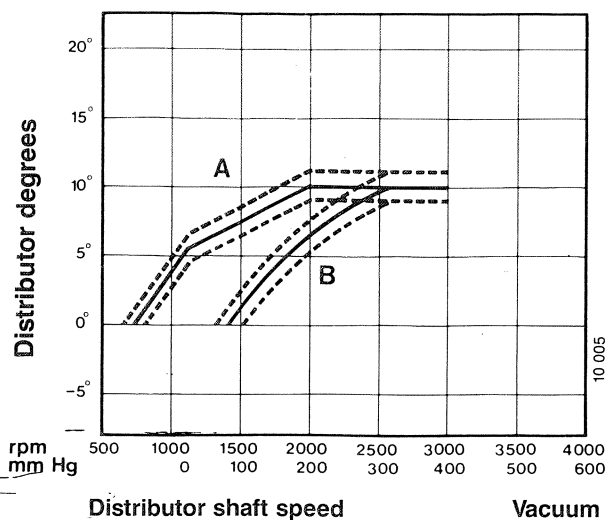
B14.1E/1S/2S



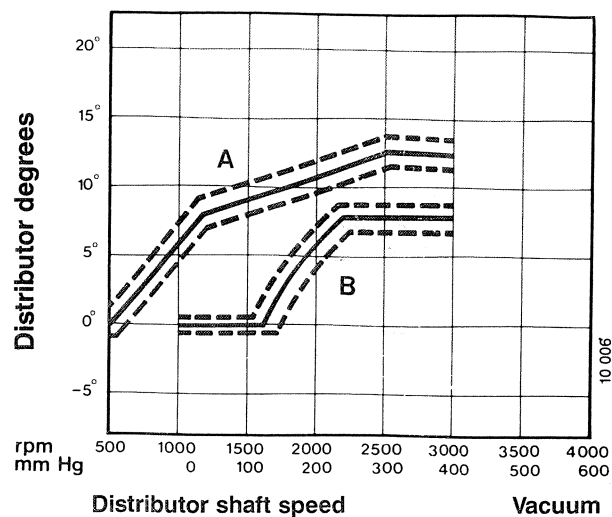
B14.2E/3S



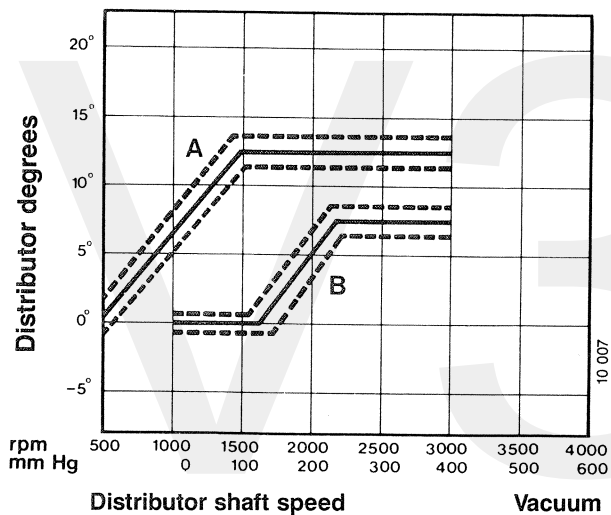
B14.3E



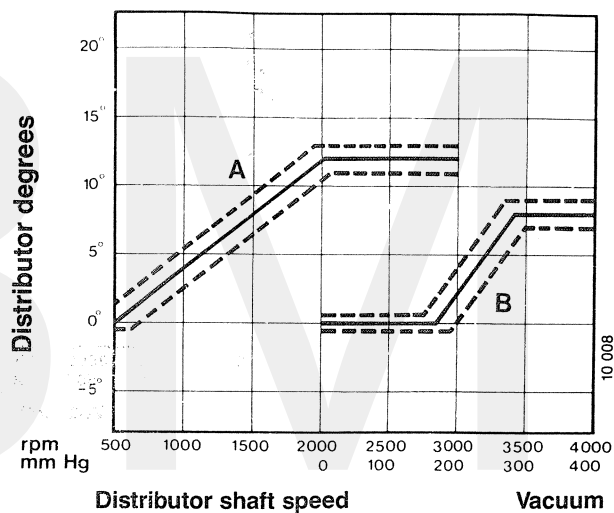
B19A, 552, 556



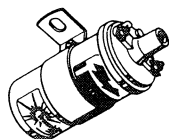
B19A, 568, 854, 906, 982, 984



B19E, 554, 556



Ignition coil



Resistance, primary winding, between terminals 1 and 15 ohm
Resistance, secondary winding, between High-Tension terminal and terminal 1 kilo-ohm
Ballast resistor (thermistor) at 20°C ohm

B14
1.32

7.5
0.68

B19A
1.9

9.5
1.3

B19E
0.7 - 0.8

7.7
n.a.

Elektronic ignition

Petrol engines from model year 1984 onwards

Ignition timing point

Indicated in degrees before TDC and measured with the vacuum hose disconnected.

Engine type	Model year	Ignition unit	Plug C disconnected and		Plug C connected and
			15 r/s	42 r/s	15 r/s
B13.4E	1989 -	402	6 ± 3	20 ± 3	-
B14.3E	1984 - 1986	401	10 ± 2	21 ± 3	-
B14.4E/O**	1984 - 1986	402	6 ± 2	20 ± 3	-
B14.4S**	1984 - 1986	402	6 ± 2	20 ± 3	MT: 3 ± 2 , AT: 0 ± 2
B14.4E/S/O	1987 -	412	6 ± 3	20 ± 3	MT: 3 ± 2 , AT: 0 ± 2
B14.4E(D)	1988 -	412	6 ± 3	20 ± 3	MT: 3 ± 2 , AT: 0 ± 2
B172	1985 - 1986	410	6 ± 3	16 ± 3	-
B172	1987 -	415	6 ± 3	14 ± 3	-
B172K(D)	1989	415	6 ± 3	14 ± 3	3 ± 2
B19A	1984 -	404	15 ± 2	24 ± 3	-
B200K**	1985 - 1986	406,407	15 ± 2	24 ± 3	-
B200E	1985 - 1986	405, 408*	12 ± 2	30 ± 3	-
B200K	1987 -	414	15 ± 3	20 ± 3	-
B200K(D)	1987 -	414	15 ± 3	20 ± 3	10 ± 3
B200EA	1987 -	411	11 ± 2	22 ± 3	-
B200E/F	1987 -	411	11 ± 2	22 ± 3	-

* Variant with engine speed limiter.

** Variant with change-up indicator.

Ignition coil

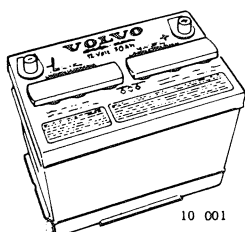
Resistance, primary winding	Ohm	0,4 - 0,8
Resistance, secondary winding, between the HT	Ohm	2,5 - 5,5

Sensor module

Internal resistance	Ohm	220 ± 60
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Section 3 Electrical system

Group 31 Battery	Page 59	Group 35 Lighting	Page 62
Group 32 Alternator	59	Group 37 Fuses	62
Group 33 Starter motor	61		



Group 31 Battery

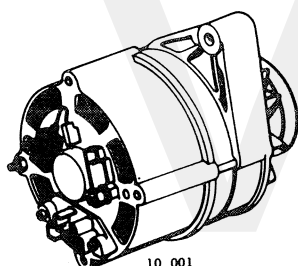
Quiescent	V 12
Starting voltage	V 9.5

	B14 Europe	B14 Nordic	D16	B172K	B172K Nordic	B19A Europe	B19A Nordic	B19E	B200
Battery capacity, standard Ah	36	45	66/60	36	45	45*	55	55	55
Recommended charging current A A	4	5	5.5	4	5	5	5.5	5.5	5.5

* up to 1982: 55A

The system voltage is 12V (battery)

The specific gravity (relative density) of the electrolyte (at 20°C) is 1.28 in a fully charged battery and 1.21 when recharging is necessary.



Group 32 Alternator

B14/D16/B172K Alternator

- A. SEV Marchal 71230212
- B. Paris-Rhône A 13R 222
- C. Paris-Rhône A 13N 64
- D. Paris-Rhône 4 grooves A 13N 29
5 grooves A 13N 139
- E. Paris-Rhône A 13N 89/ A13N 120
- F. Paris-Rhône A 13N 136

General data

	A	B	C	D*	E**	F*
Max. current rating A	50	50	50	50	50	50
Max. output W	700	700	700	700	750	750
Max. speed r/s (r/min)	250(15000)	250(15000)	250(15000)	225(13500)	250(15000)	250(1500)
Reduction ratio, engine-alternator	1.9	1.9	2.1	1.9	2.1	2.1
Min. diameter of slip rings mm	—	30	30	30	27.8	27.8
Min. length of brushes mm	8	8	8	8	—	—
Tightening torque, retaining bolts Nm	—	5.3	6.3	6.3	6.3	6.3
pulley nut Nm	45	45	45	45	45	45
Adjusting bolt, tightening torque Nm	21	21	21	21	21	21

Test values

Resistance, rotor winding ohm	5.5	5.5	4.5	4.5	3.6	3.6
stator ohm/phase	0.22	0.22	0.22	0.22	0.14	0.14
Current rating at 14V:						
33 r/s (2000 r/min) A	20	20	20	20	35	35
50 r/s (3000 r/min) A	27	27	27	27	44	44
67 r/s (4000 r/min) A	30	30	30	30	47	47

* only for D16 engines

** only for B172K engines

B19/B200 Alternator

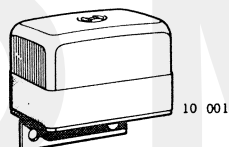
Bosch K1 14V 55A 20

Max. current rating	A	55
Max. output	W	770
Max. speed	r/s (r/min)	225 (13500)
Direction of rotation		clockwise
Min. diameter of slip rings	mm	31.5
Max. permissible radial throw,		
slip rings	mm	0.03
rotor frame	mm	0.05
Brush spring tension	N (kg)	3 - 4 (0.3 - 0.4)
Min. brush length	mm	5.0
Tightening torques, retaining bolts	Nm (kgm)	4 (0.4)
pulley nut	Nm (kgm)	40 (4.0)

Test values

Resistance, rotor winding	ohm	4 - 4.4
stator	ohm/phase	0.14 - 0.15
Current rating at 14V :		
at 33 r/s (2000 r/min)	A	36
at 50 r/s (3000 r/min)	A	47
at 67 r/s (4000 r/min)	A	52

Voltage regulator



B14/D16/B172 Engine

Type

Ducellier 8371A/Volvo 3100967-3 (mechanical)
Wehrle/Volvo 3292243-7 (electronic)
Paris-Rhône (electronic, incorporated in the alternator)

Chassis number

up to 362907
362907 - 387999
from 388000

Test conditions:

Fully charged battery, tensioned fan belt, warm alternator and voltage regulator (run engine for 3 minutes at 33.3 r/s)

Measurement values (measured on the battery)

Control voltage, unloaded, at 13.3 r/s (800 r/min) and higher	V	13.5 - 15
Control voltage, loaded with 30A, at 41.6 r/s (2500 r/min) and higher, Ducellier	V	15 - 16

B19/B200 Engine

Type

Bosch EF 14V 3B	up to chassis number 629518
Incorporated in alternator	from chassis number 629518

Test conditions

Fully charged battery	
Regulator temperature	°C + 25

Test values

Alternator speed	r/s (r/min)	100 (6000)
Engine speed	r/s (r/min)	approx. 50 (3000)
Alternator loading	A	5 - 10

Control voltage between B+ and D- on the alternator:

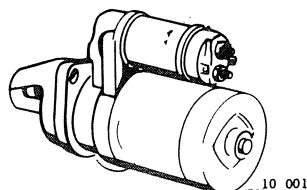
cold regulator (reading taken within 1 minute)	V	13.7 - 14.5
warm regulator (after 15 minutes driving)	V	13.5 - 14.1

Control tolerance

Load 55A alternator with 47A (rated output $\times 0.85$)

The control voltage may now be 0 - 0.3 V lower than the previous reading.

Group 33 Starter motor



General data

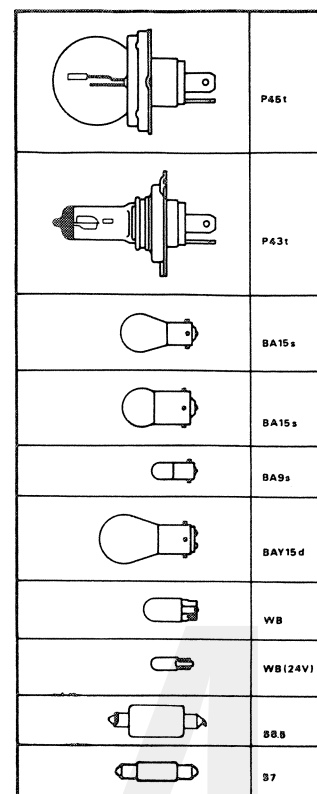
Motor type	B14	B14	D16	D16	B172K	B19	B200	B172
Make of starter motor	Ducellier	Paris-Rhône	Paris-Rhône	Bosch	Paris-Rhône	Hitachi	Bosch	Bosch
Type	6231	D9E66	D10E92	3560561	D9E 771	S114-232	00131114	3430011
Output kW (hp)	532009 532018 0.92	0.92	1.3	1.7	0.85)	1.4	1.1	0.85
Number of brushes	2	2	4	4	4	4	4	4
Axial clearance, armature	0.5	0.21-1.10	0.21-1.1	0.1-0.4	0.8	0.03-0.1	0.1-0.3	0.25-0.4
Brush spring tension N	14-16	19-21	19-21	14	15	13.7-17.7	29-25	14.5-17
Min. commutator diameter mm	30.25	—	41	31.2	2*	39	42.5	33.5
Min. brush length mm	8	9	8	12.7	6	11	8.5	9
Average thickness of commutator ... mm	—	3.8	—	32.4	3.8	—	—	—
Test values								
Unloaded starter motor								
test condition V/A	12/50	12/68	12/80	12/70	12/60	12/60	11.5/70	12/60
min. speed r/s (r/min)	136.6/8200	166/10000	66.6(4000)	3400	100/6000	117/7000	125/7500	133/8000
Loaded starter motor								
test condition V/A	9/200	9.2/230	9/400	9/450	9/200	10.3/200	—	9/265
min. speed r/s (r/min)	36.6/2200	33.3/2000	31.6/1900	17/50	40/2400	37/2200	—	22/1350
Blocked starter motor								
test condition V/A	6/350	6/400	6/800	7/800	6/480	6/650	7.4/480	6/390
min. speed r/s (r/min)	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Min. cut-in voltage, control solenoid V	8	8	8	7	7.5	8	8	8

* commutator

Group 35 Lighting

Bulbs

	Rating	Socket	Quantity
Headlights, dual filament	45/40W	P45t	2
Headlights, halogen (H4)	60/55W	P43t	2
Fog lights GLT, GLE (H3)	55W	P22	2
Parking lights, front	4W	BA9s	2
Direction indicators, front	21W	BA15s	2
rear	21W	BA15s	2
side repeaters, on wing or bumper	5W	WB	2
Tail lights	10W	BA15s	2
Tail/brake lights	5/21W	BAY15d	2
Rear warning fog lamp(s)	21W	BA15s	1 (2)
Reversing lights	21W	BA15s	2
Number plate lighting			
up to 1980	10W	BA15s	1
from 1981	5W	WB	2
Interior lighting			
up to 1979	5W	S8.5	1
from 1980	5W	BA15s	1
Glove box light from 1979	3W	S7	1
Ignition switch light from 1983	3W	S7	1
Instrument lighting	1.2W	WB	3
Switch lighting	1W	WB (24V)	4
Boot light	3W	S7	1
Selector scale light			
(automatic transmission)	1W	WB (24V)	1
Warning and indicator lamps	1.2W	WB	16
Heater control panel lighting, up to 1978	2W	BA9s	1
from 1979 to 1983	1.2W	WB	2
from 1983	1.2W	WB	1
Lighting switch illumination	1.2W	WB	1
Cigar lighter illumination	1.2W	WB	1
Torch key	1.5W	E5.5	1
+ 1.5V miniature battery		KIB	1
Ashtray illumination	1.2W	WB	1
Search-find illumination in switches	1.2W	WB	4
Clock illumination (GLS/T/E)	1.2W	WB	1
Low gear warning lamp (switch)	1.2W	WB	1
Rear window heating	198 + 13 W		
	- 12 W		



30 042

Group 37 Fuses

1976 - 1978

No. Functions energized via the ignition switch

- Direction indicator flasher unit
- Selector scale light
 - Starter relay (solenoid)
 - Reversing lights
 - Low-gear hold indicator lamp (AT)
 - Windscreen wiper stalk
- Voltage regulator
 - Blower motor
 - AT vacuum control unit
 - Idle solenoid
 - Instrument lighting, gauges
 - Warning and indicator lamps
- Windscreen wiper motor
 - Servo cylinder for clutch release gear (AT)
 - 3-way valve (Sweden)
- Headlight wiper relay
 - Headlight wiper motor (Nordic)
- Heated rear window

No. Functions powered directly from the battery

- Left-hand dipped beam
- Right-hand dipped beam
- Left-hand main beam and indicator lamp
- Right-hand main beam
- Left-hand parking lights
 - Right-hand tail lights
- Right-hand parking lights
 - Left-hand tail light
 - Number plate lighting
 - Rear warning fog lamp
 - Dashboard lighting
 - Warning buzzer (Sweden)
- Hazard warning lights flasher unit
- Brake light switch
 - Boot light
 - Clock
 - Radio
- Interior light
 - Glove box light
 - Cigar lighter
- Horns
 - Fuse 15 is 16A; all remaining fuses are 8A.

1979 - 1980 (up to introduction of new fuse box)

No. Functions energized via the ignition switch

1. Direction indicator flasher unit (under steering column from chassis No. 418383 LHD and 416556 RHD)
2. Windscreen wiper stalk
Selector scale light (AT)
Starter relay (solenoid)
Reversing lights (AT)
Low-gear hold indicator lamp (AT)
Driver's seat cushion heating (AT)
3. Voltage regulator
Blower motor
AT vacuum control unit
Idle solenoid
Instrument lighting, gauges, warning and indicator lamps
4. Windscreen wiper motor
Clutch release vacuum valve (AT)
3-way valve (Sweden)
5. Reversing lights (MT)
Driver's seat cushion heating (MT)
Headlight wiper motor (Nordic)
15. Heated rear window

1980 (with effect from introduction of new fuse box) 1981 - 1982

No. Functions energized via the ignition switch

7. Direction indicators
8. Vacuum valve for clutch release gear (AT)
AT vacuum control unit
3-way valve (Sweden)
9. Gauges, warning and indicator lamps
Headlight wiper motors
10. Driver's seat cushion heating
Reversing lights
Selector lever light switch (AT)
Selector scale light (AT)
Idle solenoid
18. Heated rear window
19. Blower motor*
Fan switch
20. Windscreen wiper motor
Low-gear hold indicator lamp (AT)

No. Functions powered directly from the battery

6. Left-hand dipped beam
7. Right-hand dipped beam
8. Left-hand main beam and indicator lamp
9. Right-hand main beam
10. Left-hand parking lights
Right-hand tail lights
11. Right-hand parking lights
Left-hand tail light
Number plate lighting
Rear warning fog lamp
Warning buzzer (Sweden)
Dashboard lighting
12. Hazard warning lights flasher unit
13. Brake light switch
Boot light
Clock
Radio
14. Interior light
Glove box light
Cigar lighter
16. Horns
Fuse 15 is 16A; all remaining fuses are 8A.

No. Functions powered directly from the battery

1. Right-hand dipped beam
Dipped beam indicator lamp
Rear warning fog lamp
2. Left-hand dipped beam
3. Left-hand main beam
Main beam indicator lamp
4. Right-hand main beam
5. Left-hand parking light
Dashboard lighting
Instrument lighting
Parking light indicator lamp
6. Right-hand parking light
11. Horn
12. Brake light
Clock
Radio
Boot light
13. Hazard warning lights flasher unit
14. Cigar lighter
Glove box light
Interior light
15. Left-hand tail light
Number plate lighting
16. Right-hand tail light
17. Not in use

Fuse 18 (heated rear window) is 16A, all remaining fuses are 8A.

*With effect from introduction of the radial fan.

*The blower motor is protected by a 25 A line fuse behind the instrument panel

1983 -

No. Functions energized via the ignition switch*

7. Direction indicators
 8. Vacuum valve for clutch release gear (AT) AT vacuum control unit (engine speed-linked relay) (B200K)
3-way valve (Sweden), glow-time relay (Diesel)
carburettor preheating
 9. Gauges, warning and indicator lamps,
shut-off valve (D16)
Headlight wiper motors (return sweep)
Electrically powered door windows (certain models as from 1984) + electrically operated mirrors
 10. Driver's seat cushion heating
Reversing lights
Selector lever light switch (AT)
Selector scale light (AT)
Idle solenoid (fuel cut-off)
 18. Heated rear window and warning lamp
 19. Blower motor (speeds 1 and 2)
Fan switch
 20. Windscreen wiper motor
Windscreen washer pump
Headlight wipers
Low-gear hold indicator lamp (AT)
- *From model year 1984: via ignition switch relay

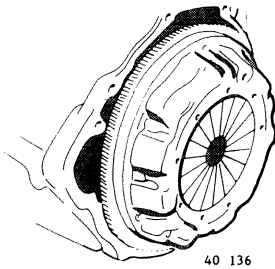
No. Functions powered directly from the battery

1. Right-hand dipped beam
Rear warning fog lamp and warning lamp
(Switzerland)
Fog lights, relay (GLT, Sweden and Germany)
2. Left-hand dipped beam
3. Left-hand main beam
Main beam indicator lamp
4. Right-hand main beam
5. Left-hand parking light
Dashboard lighting
Instrument lighting
Parking light indicator lamp
Fog lights relay (GLT, except Sweden and Germany)
6. Right-hand parking light
11. Horn
Engine cooling fan (340 as from 1984)
12. Brake light
Radio
Blower motor (max. speed)
13. Hazard warning lights flasher unit
hazard warning installation
14. Cigar lighter
Glove box light
Boot light
Ignition switch light
Interior light
Clock
Central door-locking (certain models as from 1984)
15. Left-hand tail light
Number plate lighting
16. Right-hand tail light
17. Not in use
- Line fuse behind dashboard: rear warning fog lamp and warning lamp
Fuses 11, 14, 18 and 19 are 16A, fuse 12 is 25A; all remaining fuses are 8A.

Note: on cars with **electrically powered** door windows, fuse No. 9 is 25A.

Auxiliary fuse box

(GLE-GLT models, fitted between the battery and the left-hand inside front wing.) Two 8 A fuses for the fuel pump and the fog lights plus a 16 A fuse for the oxygen sensor (B200F).



Section 4 Power transmission

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Group 41 Clutch

Mechanically operated clutch

Clutch type	single dry plate
Clutch plate diameter	
B14	190
B19	215
Thrust bearing	
up to 1980	self-centering, non-rotating
front 1981	self-centering, rotating
Release fork free travel	
with non-rotating thrust bearing	3 - 5
with rotating thrust bearing	none
Clutch pedal free travel	
with non-rotating thrust bearing	13
with rotating thrust bearing	none
Clutch pedal height with rotating thrust bearing	
LHD	140 - 150
RHD	150 - 160

Tightening torques

	B13/B14/D16/B172	B19/B200
Clutch assembly bolts	23	23
Clutch housing bolts	45	60
Bearing housing nuts	23	n.a.
Axle shaft flange to clutch housing	n.a.	47

Centrifugal clutch

Clutch type	single disc dry plate clutch with centrifugal (bob) weights
Clutch plate diameter	181.5
Engaging speed at a torque of	
0 Nm	17.5 - 19.2 (1050 - 1150)
103 Nm	39.2 - 42.5 (2350 - 2550)
Decutching	by means of vacuum powered servo cylinder
Transmission disengaged	
max. speed	33.3 (2000)
Servo cylinder free travel (clearance between release fork and clutch housing)	1.0 - 1.5
Clearance between clutch plate and flywheel	
when checking	0.5
when adjusting	0.1 - 0.3

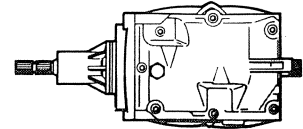
Tightening torques

	Nm
Clutch assembly, hex. socket-head bolts	20
Clutch housing bolts	45
Bearing housing nuts	24

Group 43 Manual gearbox

Gearbox

Type	M45R	M47R
Reduction ratios		
1st gear	3.71:1	3.71:1
2nd gear	2.16:1	2.16:1
3rd gear	1.37:1	1.37:1
4th gear	1.00:1	1.00:1
5th gear	—	0.83:1
reverse	3.68:1	3.68:1



Clearances

Type	M45R	M47R
Clearance between reverse gearwheel and gear selector	mm	mm
Axial clearance, input shaft	mm	mm
countershaft	mm	n.a.
mainshaft	mm	mm
countershaft pre-load	mm	mm

Note: approximate the minimum clearance/maximum pre-load as closely as possible

Lubricating oil

Type	ATF type A, suffix A	
	Capacity	Oil change capacity
M45R, up to 1984	litre	litre
from 1984	litre	litre
M47R, rear filling plug	litre	litre
front filling plug (up to 1985)	litre	litre
front filling plug (from 1985)	litre	litre

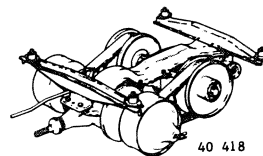
Tightening torques

	Nm
Front casing bolts	42
Gearbox-final drive, bolts and nuts	42
Gearbox cover bolts	20
Level plug and drain plug (hexagon socket-head)	33
Level plug (hexagon-head bolt)	42.5
Front casing-cross member nuts, B14	21
Bolt in 5th gear wheel	40
Front cross member nuts-subframe member	47
Axle shaft flange-gearbox (B19/B200)	72
Studs in gearbox (without locking agent)	17
Bolts, output shaft bearing housing (M47R)	20
Front casing-rubber mounting, bolts, D16	25
D16 three-point mounting on body	25

Group 43/46 Automatic transmission

General data

Type	continuously variable
Total reduction (secondary pulley gap = 1.5 mm), - maximum	14.15:1
- minimum	4.00:1
Control range	3.54



Primary unit

Reduction ratio (same for reverse)	1.53:1
---	--------

Drive belts

Gap between pulley halves, setting value	mm 1.5 - 2.0
Minimum permissible gap between pulley halves	mm 1.5

Secondary unit

Reduction ratio	4.51:1
-----------------------	--------

Lubrication

Primary and secondary units

Lubricating oil, Europe	API GL-4 or GL-5 (MIL-L-2105 B or C)
Nordic	SAE 80W - 90
	ATF type A/A

Capacity	
primary unit	litre 0.625
secondary unit	litre 1.120
Oil change capacity	
primary unit	litre 0.55
secondary unit	litre 1.00

Sliding pulley halves

Lubricating oil	ATF type A/A
Capacity, primary unit	cc 100
secondary unit	cc 75

Hubs of sliding pulley halves

Lubricant	Molykote BR2S
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Tightening torques

Primary unit	Nm
Rear cover nuts	13
Bearing housing nuts	14
Pinion shaft nut	62
Forward drive gear nut	160
Cross shaft nuts	117
Level plug	42
Drain plug	42
Lock nut for adjustment of locking sleeve shaft	30
Nuts on subframe member	26

Secondary unit	Nm
Gear shaft nuts	190
Gear case (halves) retaining nuts	17
Level plug	42
Drain plug	42
Nuts on subframe member	26

Vacuum control system

Microswitch cut-in speed	r/s (r/min)	40 - 43.3 (2400 - 2600)
Electromagnetic vacuum valve setting*, up to 1978	kPa	45
from 1978	kPa	50
Clutch release valve, vacuum setting	kPa	44

*measured at right-hand side of vacuum valve

Vacuum control unit (from 1978)

Type	Bosch 0 335 530 016
Set speed	r/s (r/min) 29.2 - 30.8 (1750 - 1850)

Group 45 Propeller shaft

Automatic gearbox: splined joint between clutch shaft/propeller shaft and propeller shaft/pinion to be treated with High Tack adhesive compound.

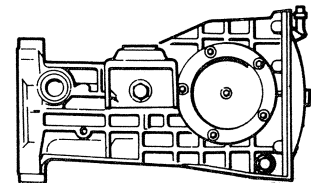
Tightening torques

	B14/D16/B172K	B19/B200
Axle shaft flange-clutch housing	Nm (kgm)	47 (4.7)
Axle shaft flange-gearbox	Nm (kgm)	72 (7.2)
Clamp coupling bolts (prop. shaft)	Nm (kgm)	34 (3.4)

Group 46 Final drive

General data

Type	bevel gears (hypoid) with differential
Reduction ratio*	
M45R B14, up to 1982	3.91:1
B14, 1982 - 1983	3.82:1
B14, 1984	3.64:1
B14.4, Overseas	3.82:1
B19A, up to 1982	3.64:1
B19A, 1982 - 1983	3.45:1
M47R B14, from 1983	3.82:1
D16, from 1985	3.82:1
B172K 1986 (France)	3.45:1
B172K 1986	3.64:1
B19A, 1982 - 1983	3.45:1
B19A, 1984	3.36:1
B19E (GLT), from 1983	3.64:1
B19E (GLE), 1984	3.36:1
B200K*	3.27:1
B200KO*	3.45:1
B200EO GLT/GLE*	3.64:1
B200E GLT 1985*	3.64:1
B200E GLE 1985*	3.45:1
B 200EA	3.64:1



40 419

*All B200 models from 1987 3.64:1

Backlash	mm	0.10 - 0.20
Pre-load on pinion bearings	Nm (kgm)	0.6 - 2.2 (0.06 - 0.22)
Pre-load on differential bearings	Nm (kgm)	1.1 - 2.3 (0.11 - 0.23)

*Shown on casing		
up to 1983		punched in casing
from 1983		shown on coloured sticker

Lubricating oil

Quality		API GL-5 (MIL-L-2105 B or C)
Viscosity		SAE 90
Capacity, B14 up to 1982	litre	1.45
B14 from 1982	litre	1.35
D16 from 1985	litre	1.35
B172K	litre	1.355
B19/B200 (M45R)	litre	1.5
B19/B200 (M47R)	litre	1.35

Tightening torques

	Nm
Pinion shaft nut (without compressible ring)	250
Bearing housings, bolts*	23
Bearing housings, flanged bolts*	28
Flanged axle shafts, bolts	23
Rear cover bolts (M6 and M8)	9
Level plug and drain plug	42.5
Differential bolts, M8**	65
Differential bolts, M12***	137
Cross member-mounting pad, nuts (B14/D16/B172K)	47
Final drive casing-cross member, nuts (B14/D16/B172K)	21
Mounting bracket-final drive casing, bolt (B19/B200)	75
Rubber mounting-bracket, bolts (B19/B200), "Nylock" lock nut	26.5
"Clevelock" nut	21.5
Gearbox-final drive, hexagon socket-head bolt (M45R)	42.5
Gearbox-final drive, bolts and nuts (M47R)	42
Bracket-cross member, bolts (B19/B200)	47

* Use locking agent (Part No. 360874).

** Use locking agent (Part No. 360874) for the bolts, and Loctite 510 Flange Sealant for the crown wheel-differential housing joint.

*** Do not use a locking agent.

Half shafts

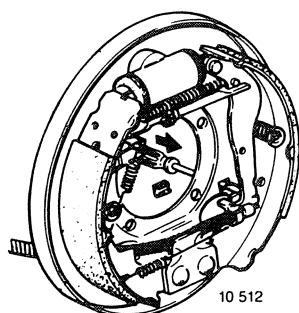
Lubrication of CV joint	Molykote VN2461C
	Service: Gleitmo 500 (Part No. 1161029)

Tightening torques

	Nm
Half shaft with hexagon socket-head bolt (B14/D16/B172K)	40
Half shaft with flanged-head bolt	49
Half shaft with hexagon socket-head bolt (B19/B200)*	40

*Use locking agent (Part No. 1161053).

Section 5 Brakes



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Group 51 Wheel brakes

Front wheel brakes

Type	disc brakes		
		Up to 1980	from 1980
Lining area (4 brake pads)	cm ²	112	160
Swept area, both wheels	cm ²	1130	1082
Brake calipers			
Type	fixed caliper		sliding caliper
Number of pistons	2		1
Piston diameter	48		48
Brake discs			
Diameter	mm	232.7	239
Thickness, new	mm	9.85	12.85
Reconditioned thickness, minimum	mm	9.1	11.8
Thickness, minimum	mm	8.5	11.2
Max. lateral throw	mm	0.15	0.15
(measured with disc removed)	mm	0.05	0.05
Max. permissible thickness variation over entire swept surface of any single disc	mm	0.02	0.02

Brake pads			till 1985 GLT/GLE	All models from 1986	B14, D16 B172K	B200
Type	Textar T269(277)GF	DAN Block 832GF	Jurid 516	—	Textar T064	Energit 550
Thickness, new	mm	mm	mm	—	mm	mm
minimum	mm	mm	mm	—	mm	mm
	9,7	14,3	14,3	—	14,3	14,3
	2	2	2	—	2	2

Rear wheel brakes

Type	B14/D16/B172K drum brakes HASC 3, self-adjusting 8	B19/B200 drum brakes HASF, self-adjusting 9
Diameter		

Brake drum

	B14/D16/B172K	B19/B200
Diameter, new	203.2	228.6
Reconditioned diameter, maximum	204.2	229.6
Diameter, maximum	204.7	230.1

Wheel cylinder

Number per wheel	1	1
Diameter	19.05	20.64

Brake shoes

	B14/D16/B172K	B19/B200
Number per wheel	2	2
Lining thickness, new	4.5	5.0
minimum	2	1
Lining width	36.5	40

Group 52 Hydraulic brake system

Master cylinder and brake servo

Type and diameter of brake servo unit	Girling 8" tandem	Bendix 7.5" tandem	Bendix 9" tandem	Isovac 9' from '86
Engine type	B14	B14 from 451743	B19/B200	B14/D16LHD
Chassis number	up to 451743	451743 D16LHD from 000500 + D16RHD	—	B172/B200
Bore × stroke of master cylinder	19.05 × 34.5	20.64 × 36	20.64 × 36	20.64 × 36
Brake fluid	DOT4	DOT4	DOT4	DOT4

Vacuum pump (Diesel)

Make and type	Saginaw L 92503
Minimum delivery at 3500 r/min	70

Control value: at a pump speed of 250 r/min a vacuum pressure of 33.3 kPa must be obtained within 10 seconds in a test capacity of 6 litres.

Control value: from a vacuum level of 70 kPa the pressure should not drop more than 3.4 kPa within 3 seconds with a stationary pump and an airtight-sealed inlet port.

The pump body should be filled with 20 cc of oil SAE 80W/90.

High-pressure switch

(Automatic transmission only from 1978)

Cut-in pressure	MPa (kg/cm ²)	1.8 - 2.2 (18 - 22)
-----------------------	---------------------------	---------------------

Pressure conscious reducing valve

Type	Chassis number	Transmission	Identification No. on valve
Girling	up to 377183	AT	—
ATE	377183-458000	AT	25/5
ATE	458000-545500	AT	30/3
ATE	from 545500	AT	25/5
ATE		M45R/M47R	30/3

Tightening torques

	Nm
Retaining bolts, backplate	53
brake caliper (up to 1980)	68
brake caliper body (from 1980)	123
retaining pins (from 1980)	33
brake disc on hub	47
brake disc guard plate	15
Retaining nuts, master cylinder (up to 1980)	24
master cylinder (from 1980)	14
Girling brake servo	13
Bendix brake servo	22
Wheel cylinder, B14/D16/B172K	6
Wheel cylinder, B19/B200	8
High-pressure switch	19
Brake line couplings - brake hoses	14
Bleedscrews, front wheel	6
rear wheel	8

Group 55 Handbrake

Handbrake

Maximum rack free travel, B13/B14/D16/B172	3 or 4 notches
B19/B200	5 to 7 notches

Section 6 Suspension and steering

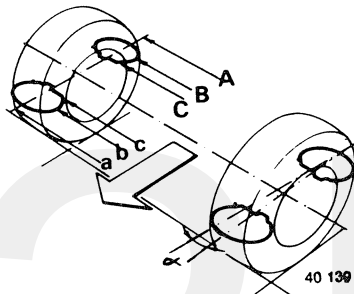
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Group 60 Wheel alignment

Unladen car

	Repair value	control value
King pin inclination (KPI)	$9^{\circ}35' \pm 30'$	$9^{\circ}35' \pm 1^{\circ}$
Castor	$7^{\circ}30' \pm 30'$	$7^{\circ}30' \pm 1^{\circ}$
Camber, front, B13, B14	$+30' \pm 30'$	$+30' \pm 1^{\circ}$
front, D16, B172, B19, B200	$-30' \pm 30'$	$-30' \pm 1^{\circ}$
rear	$-2^{\circ} \pm 30'$	$-2^{\circ} \pm 1^{\circ}$

Toe-in

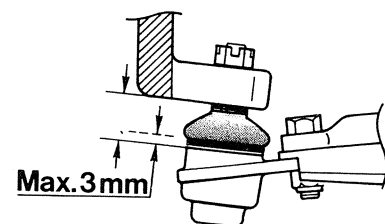


	Angle 2	A-a	B-b	C-c
Front	$30' \pm 8'$	$5 \pm 1.2 \text{ mm}$	$4 \pm 1 \text{ mm}$	$3.1 \pm 0.8 \text{ mm}$
Rear	$0^{\circ} \pm 20$		$0 \pm 3 \text{ mm}$	

Group 61 Front suspension

Steering swivel ball joints

Max. axial displacement	mm	3
Max. radial play	mm	0.5



Tightening torques

Front suspension

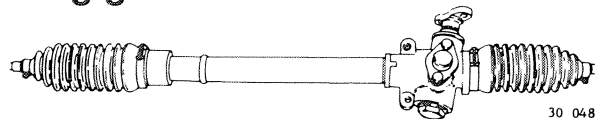
	Nm
Brake caliper attachment up to 1980	68
Brake caliper attachment from 1980	123
Stabilizer link nut	22
Rear nut on reaction rod	28
Lock nut, front wheel bearings	55*
Brackets, reaction rod	60
Nuts, wishbone pivot	85
Steering swivel ball joint-wishbone	50

* After tightening, slacken 90° and then lock the nut

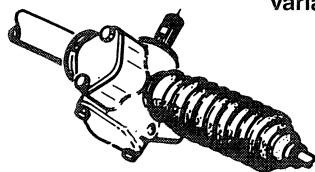
Group 64 Steering gear

Steering housing (without power steering)

Type

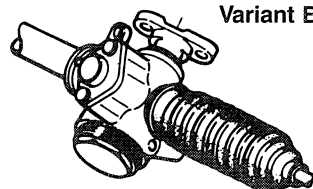


Rack-and-pinion



Variant A

40 420



Variant B

40 421

	A		B	
	B14	B14/D16	B17K/B19/B200	
Number of turns, steering wheel, lock to lock	4.13	4.13/4.4	4.4	
Pinion shaft bearing, clearance	- 0.07 to + 0.04	0.1 max.	0.1 max.	
Thrust block, axial clearance	0.12 - 0.15	0.2 - 0.15	0.2 - 0.15	
Max. turning moment, pinion shaft	1.5	1.5	1.5	
Reduction ratio	20.3:1	20.3:1/21.8:1	21.8:1	

Lubrication

Type
Quantity cc

grease, Volvo Part No. 1161001-1
50

Tightening torques

	Nm
Steering housing bolts	22
Steering wheel nut	50
Lock nut on adjusting bolt	30
Thrust block/steering housing cover, bolts	22
Steering rod-rack	100
Steering swivel ball joints (castle nut)	60
Screw cap, steering housing	40
Pinion shaft lock nut	25
Steering rod end, lock nut	75
Steering rod end, castle nut	55
Thrust block adjusting bolt*	1.3

* Then slacken 40°

Steering house (with power steering)

Type
Number of turns of steering wheel, lock-to-lock

Rack-and-pinion

3.1

Thrust block end play

0.05 - 0.13

Pinion shaft turning moment

0.7 - 1.50/0.07 - 0.15

Power steering hydraulic pump

Make
Normal value (high pressure test) kPa(kg/cm²)

Saginaw TC.
8000 (89)

Steering housing lubrication

For service purposes Volvo grease
(Part No. 1161001) should be used.

Quantity cc
Hydraulic fluid
Tank capacity litres

50
ATF type A, F or G
0.7

Tightening torques	Nm
Stub axle ball joint, lock nut	55
Power-assisted steering, attachment	21
High pressure pipe on power steering pump	26
Pinion shaft, lock nut	40
Thrust block, retaining nut	5.3
Tie rod to rack	85
Unions for connecting high pressure pipes to steering housing	35
Unions for connecting hoses to steering housing	35
Retaining bolts and nuts for steering gear	29
Tie rod end, self-locking nut	55
Tie rod end, lock nut	75
Regulating valve in pump body	75

Group 65-Rear suspension

Tightening torques	Nm
Axle shaft nuts, B14/D16/B172K	245
B19/B200	220
Bearing housing/brake backplate bolts	53
Spring anchor plate, retaining nuts	53
Spring shackles and spring eyes, nuts	53
Rear reaction rod retaining bolt	53
Half shaft with hexagon socket-head bolt (B14)	40
Half shaft with flanged-head bolt (B19)	49
Half shaft with hexagon socket-head bolt (B19/B200)*	40

* Use locking agent (Part No. 1161053).

Section 7 Springs, shock absorbers and wheels

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Group 72 Springs

Front springs

Type coil spring

	B14 (up to 1978)	B14 (1978 - 1983)	B14 (1984)	D16 from 1984	B172K	B19A up to '83	B19A (1984)
Free length mm	366	350	361	367	352	357	339
Number of coils 6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Wire diameter mm	10.4	10.7	10.7	11.0	11.0	11.6	11.6
Coil diameter mm	116	116	116	116	116	116	116
	B19E (1983)	B19E (1984)	B200	B200 GLS	B200 GLS/GLE from '85	B200 GLT	
Free length mm	326	308	308	339	326	308	
Number of coils 6.5	6.5	6.5	6.5	6.5	6.5	6.5	
Wire diameter mm	11.9	11.9	11.9	11.9	11.9	11.9	
Coil diameter mm	116	116	116	116	116	116	

Rear springs

Type		asymmetric, parabolic rolled leaf
Number of leaves		spring
Length, up to 1980	mm	1
from 1980	mm	1260
Width	mm	1250
		60

Note:

Always fit the car with two springs marked with the same colour code.

Tightening torques

	Nm
Shock absorber union nut, front — '86	120
'86 —	50
Shock absorber upper attachment bolts, front (3 bolts)	22
Shock absorber piston rod, front	65
Stabilizer link nut, front	22
Rear reaction rod nut, front	27
Spring shackle attachment	53
Leaf spring attachment	53
Retaining bolt, rear reaction rod	53
Spring eye attachment	53
Rear shock absorber (top and bottom)	24
Stabilizer rod retaining bolts	22
Parallel link (from shock absorber stabilizer)	60

Group 77 Wheels, tyres, hubs

Wheels	Tyres	Model
5.0J × 13*	155 SR 13 175/70 SR 13	all models up to 1982
5.0J × 13	175/70 SR 13	340 GL, from 1983 340 GL, B172K from '86** 360 GLS, up to 1984
5.0J × 13	175/70 R 13 T	360 GLS, from 1985
5.5J × 13 (alloy)	175/70 R 13 T	360 GLE, 1985
4.5J × 13	155 SR 13	340 L and DL, from 1983
5.5J × 14 (alloy)	185/60 HR 14	360 GLT, 1983 - 1984
5.5J × 14 (alloy)	175/65 R 14 T	360 GLT, 1988 —
4.5J × 13	155 D 13 "Special Spare"	Certain markets from 1981

* Earlier type wheels must not be fitted on cars from model year 1980 onwards.

** Latest type wheels must not be fitted on cars before model year 1985.

Wheels

Max. radial throw	mm	1.0
Max. warp	mm	1.0
Max. out-of-balance	Nm	0.03
Distance from attachment face to rim centre line:		
up to 1980	mm	50
from 1980	mm	40

Tyres

Type	tubeless
Wear indicator	mm 1.6

Tyre pressures (cold tyres)

	kPa	atm.	psi
Front, normal load	190	1.9	27
Rear, normal load	210	2.1	30
Rear, heavy load*	240	2.4	34
"Special Spare"	250	2.5	35

*This is also the maximum permissible tyre pressure.

Tightening torques

	Nm
Wheel nuts	115
Dust shield on brake caliper	16
Lock nut, front wheel bearing*	55

*After tightening, slacken 90° and then lock the nut.

V3M