

# Section 2 Motor B 20

## Group 20 General

Performance, compression, octane requirements

Engine variant	Comp. ratio	Rec. octane RON	Power		Max. torque	
			kW at r/s	hp (bhp) at rpm	Nm at r/s	kpm (ft.lbs) at rpm
<b>B 20 A</b> 1975-1976	8.7:1	93	60/78	82/4700	157/38	16.0/2300
<b>B 20 F</b> 1975	8.7:1	91	85/100	115/6000	157/58	16.0/3500

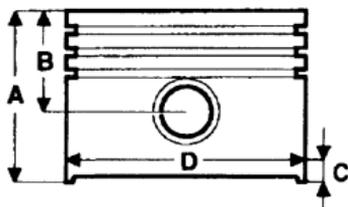
### Other general data

No. of cylinders.....	4
Cylinder bore..... mm	88.9
Stroke..... mm	80
Displacement..... dm <sup>3</sup> (litres)	1.99
Firing order.....	1-3-4-2
Compression (standard value)..... MPa	0.9 - 1.1
max. deviation between cylinders..... MPa	0.2
Weight approx., incl. electrical equip..... kg	155

## Group 21 Engine block

<b>Cylinder head</b>		
Height, new .....	mm	87.0
min. after machining .....	mm	86.0
<b>Max. warp</b>		
along .....	mm	0.2
across .....	mm	0.2
<b>Cylinder head gasket thickness .....</b>		
unloaded .....	mm	1.2
loaded .....	mm	1.0

<b>Cylinder block</b>		
<b>Cylinder bore (D)</b>		
Standard (C-marked) .....	mm	88.90 - 88.91
(D-marked) .....	mm	88.91 - 88.92
(E-marked) .....	mm	88.92 - 88.93
(G-marked) .....	mm	88.94 - 88.95
Oversize 1 .....	mm	89.29 - 89.30
2 .....	mm	89.67 - 89.68



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Engine type	Dimensions in mm		
	A	B	C
<b>B 20</b>	71.0	46.0	7.0

<b>Pistons</b>	
<b>Piston diameter (D)</b> (measured at right angles to gudgeon pin hole, dim. C from lower edge of piston)	
• Standard (C-marked)..... mm	88.88 - 88.89
(D-marked)..... mm	88.89 - 88.90
(E-marked)..... mm	88.90 - 88.91
(G-marked)..... mm	88.92 - 88.93
• Oversize 1..... mm	89.27 - 89.28
2..... mm	89.65 - 89.66
<b>Piston clearance, new piston..... mm</b>	0.01 - 0.03
used piston, max..... mm	0.08
<b>Piston weight</b>	
• Max. weight diff. between pistons in same engine..... g	10
• Piston weight..... mm	507 ± 5
<b>Piston rings, width</b>	
• upper comp. ring..... mm	1.98
• lower comp. ring..... mm	1.98
• oil scraper ring..... mm	4.74
<b>Piston rings, axial clearance</b> (measured with ring on piston)	
• upper comp. ring..... mm	0.040 - 0.072
• lower comp. ring..... mm	0.040 - 0.072
• oil scraper ring..... mm	0.040 - 0.072
<b>Piston rings, gap</b> (measured in cylinder)	
• upper comp. ring..... mm	0.40 - 0.55
• lower comp. ring..... mm	0.30 - 0.45
• oil scraper ring..... mm	0.25 - 0.45
<b>Gudgeon (piston) pin</b>	
• Diameter, standard..... mm	
oversize..... mm	

- fit in connecting rod..... Light thumb pressure (close running fit)
- fit in piston..... Thumb pressure (push fit)

## Valve system

Valve clearance	
• cold or warm engine .....	mm 0.40 - 0.45

Valve springs	
Length in mm	Load N(kp)
46.0	0
40.0	272-318
30.0	782-868

Valve guides	Intake	Exhaust
Length .....	mm 52.0	59.0
Inner diameter.....	mm 8.000 - 8.022	8.000 - 8.022
Height above face of cyl. head		
B 21 A .....	mm 17.5	17.5
B 21 F .....	mm 17.9	17.9
Play, valve spindle – guide (measured with new valve)		
new .....	mm 0.030 - 0.068	0.060 - 0.097
max. ....	mm 0.15	0.15

Valve seats	Intake	Exhaust
• matching surface width .....	mm 1.8 - 2.2	1.8 - 2.2
• matching surface angle.....	° 45	45
• reduction angle,		
upper.....	° 15	15
lower .....	° 70	70
Valves	Intake	Exhaust
• diameter, disc .....	mm 44.00	35.00
stem, new.....	mm 7.955 - 7.970	7.925 - 7.940
min. ....	mm 7.935	7.905
• matching surface angle.....	° 44.5	44.5



## Crank assembly

### Crankshaft

Out-of-true, deviation, max. ....	mm	0.05
Crankshaft, axial clearance, max. ....	mm	0.25
Main bearing, radial clearance.....	mm	0.028 - 0.083
Crankshaft bearing, axial play.....	mm	0.15 - 0.35
Crankshaft bearing, radial play.....	mm	0.024 - 0.070

### Main bearing journals

Diameter, standard.....	mm	63.451 - 63.464
undersize 1.....	mm	63.197 - 63.210
undersize 2.....	mm	62.943 - 62.956
Out-of-roundness, max.....	mm	0.07
Taper, max. ....	mm	0.05
Axial bearing width, standard.....	mm	38.960 - 39.000
oversize 1.....	mm	39.061 - 39.101
oversize 2.....	mm	39.163 - 39.203

### Connecting rod bearing

Diameter, standard.....	mm	53.987 - 54.000
undersize 1.....	mm	53.733 - 53.746
undersize 2.....	mm	53.479 - 53.492

Out-of-roundness, max..... mm 0.05

Taper, max. .... mm 0.05

### Connecting rod

play at crankshaft ..... mm 0.15 - 0.45

### Max. weight diff. between

    connecting rods in the same engine..... g 10

### Flywheel

#### Axial runout,

    max. per 150 mm diameter..... mm 0.05

## Tightening torques

Applies to greased nuts and bolts.	Nm
<b>Cylinder head</b> (stage 1) .....	40
(stage 2).....	80
(stage 3) after 10 min. running engine .....	90
Tighten bolts in sequence from the middle and out.	
<b>Main bearing cap</b> .....	110
<b>Connecting rod cap</b> , old bolts .....	63
new bolts.....	70
<b>Camshaft wheel</b> .....	130 - 150
<b>Crankshaft, centre bolt</b>	
single pulley .....	95 - 105
2- and 3-track pulley .....	120 - 140
<b>Flywheel/carrier plate</b>	
(use new bolts).....	70
<b>Spark plugs</b> , (do not oil threads) .....	25

## Group 22 Lubrication system

### General

Oil capacity and quality, see page 16

### Oil pressure with warm engine and new oil filter:

engine speed r/s (rpm)	oil pressure MPa
33 (2000)	0.25 - 0.60

### Oil pump

Axial play.....mm	0.02 - 0.12
Radial play (excl. bearing play) .....mm	0.02 - 0.09
Gear flank play (excl. bearing play) .. mm	0.15 - 0.35
Bearing play, drive spindle .....mm	0.032 - 0.070
trailing spindle.....mm	0.014 - 0.043
Length, reduction valve spring at different loads .....mm/N	39.2 / 0 26.25 / 46 - 54 21.0 / 62 - 78

## Group 23 Fuel system

CO-content, idle speed				
Engine variant	Model year	CO-content %		Idle speed r/s (rpm)
		Adjustment	Check	
B 20 A	1975	2.5	1.5 - 4.0	11.7 (700)
	1976	1.5	0.5 - 4.0	11.7 (700)
B 20 F	1975	1.5	0.5 - 4.0	11.7 (700)

### Fuel pump

Fuel pressure measured at the same height as the pump  
at 16.6 r/s (1000 rpm) kPa

### Carburettor

SU-HIF 6

Metering rod, 1976 Sweden .....	BDG
Others .....	BCJ
Needle valve, size .....	mm 1.75
Float level, below surface .....	mm 0.5 - 1.5
Gap between piston and bridge, position at rest.....	mm 0.2 - 0.3
Clearance, damper piston .....	mm 1.1 - 1.7
Oil level in damper cylinder (below edge) .....	mm 6
Fast idle	
with choke control out 25 mm .....	r/s 18.3 - 25.0
.....	(rpm) (1100 - 1500)

Solex (Zenith) 175 CD

Metering rod.....	B1CC
Needle valve, size .....	mm 1.75
Float level, front edge .....	mm 9 - 13
rear edge.....	mm 15 - 17
Temperature compensator, marking .....	120 K
Clearance, damper piston .....	mm 1.0 - 1.8
Oil level in damper cylinder (below edge) .....	mm 6
Fast idling	
with choke control out 25 mm .....	r/s 18.3 - 25.0
.....	(rpm) (1100 - 1500)

## CFI system (B 20 F)

### Pressure

system pressure.....	kPa	450 - 520
shut-off pressure.....	kPa	170 - 240
regulator pressure, warm engine .....	kPa	350 - 390

### Injector

opening pressure .....	kPa	330
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### Fuel pump

capacity at 500 kPa system pressure .....	dm <sup>3</sup> /h	100
Current consumption.....	A	8.5

### Auxiliary air supply

fully open .....	°C	- 30
fully closed.....	°C	+ 70

# Group 26 Cooling system

## General

Use Genuine Volvo green coolant, type C, mixed 50/50 with clean water.

This mixture helps prevent corrosion and damage by freezing.

- Never top up the coolant system with only water. Use Genuine Volvo coolant diluted 50/50 with clean water.
- The coolant does not normally require changing. In the case of major repairs requiring the draining of the coolant, fresh coolant must be used since the drained coolant will have been subjected to oxidation and will contain dirt particles.
- Flush the cooling system when changing the coolant.  
Use flushing agent P/N 11 61 328-8.

Engine type	Approx. volume litres	Expansion tank. Pressure valve opens at		Thermostat*			
		Pos. pressure kPa	Neg. pressure kPa	°C (°F)			
				Type	Marking	Starts opening	Fully open
B 20 A/F (manuell)	9.3	65 - 85	7	82	82	82 (180)	92 (198)
				92	92	92 (198)	102 (216)
B 20 A/F (automat)	9.1	65 - 85	7	82	82	82 (180)	92 (198)
				92	92	92 (198)	102 (216)

Fan belts

Designation, standard ..... HC 38 x 888  
                  alternative ..... HC 47 x 888

Tightening torque

Screw on Engine cooling fan, self-locking for fixed fan ..... Nm 20 - 25

## Group 28 Distributor ignition system (D!)

Engine type	Ignition setting		Sparkplugs		
	° btcdc	Engine speed r/s(rpm)	Desig.	P/N	Kit no.
<b>B 20 A</b>	10	12.5 ± 0.8 (750 ± 50)	W7B	241 946-3	273 525-6
	27	41.7(2500)			
<b>B 20 F</b>	10	12.5 ± 0.8 (750 ± 50)			

### Distributor (B 20 A)

Bosch P/N .....	0 231 170 085
Volvo P/N .....	462 657-8
Rotates counterclockwise	
Contact breaker gap..... mm	0.35
Dwell angle at 83 r/s(500 rpm)..... °	62 ± 3
Bearing pressure .....	N 65 - 80
<b>Centrifugal advance</b>	
Advance total, ..... distributor degrees	62 ± 3
Advance begins at ..... revolutions per sec(distributor rpm)	9.2 - 10.8 (550 - 650)
Advance value	
5° at ..... revolutions per sec(distributor rpm)	15.8 - 19.0 (950 - 1140)
10° at ..... revolutions per sec(distributor rpm)	23.2 - 26.3 (1390 - 1580)
Maximum advance at ..... revolutions per sec(distributor rpm)	29.2 (1750)
<b>Vacuum advance</b>	
Control direction..... positive	
Max. control, ..... distributor degrees	62 ± 3
Control begins at ..... mm Hg	60 - 100
Value: 2° at ..... mm Hg	85 - 130
5° at..... mm Hg	130 - 180
Control, maximal at ..... mm Hg	175 - 185

### Ignition coil (B 20 A)

Volvo P/N	Manufacturers P/N	Resistance in windings	
		primary (1 and 15)	secondary (1 and high)
12 19 189-9	0 221 119 028	2.7 - 3.0 Ω	8 - 11 kΩ