Section 2 B17, B19, B21, B23 Engines

Group 20 General

General data

	B 17	B 19	B 21	B 23
No. of cylinders	4	4	4	4
Cylinder bore ..... mm	88.9	88.9	92.0	96.0
Stroke ..... mm	71.85	80.0	80.0	80.0
Displacement ..... dm^3 (litres)	1.784	1.99	2.127	2.32
Firing order	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2
Compression, min. ..... MPa	0.9	0.9	0.9	0.9
Max. deviation between cylinders ..... MPa	0.2	0.2	0.2	0.2
Weight, approx. ..... kg	155	155-165	155-165	155-165

Performance, compression, octane requirements

Engine variant		Comp. ratio	Rec. octane RON	Power (DIN)		Max. torque (DIN)	
				kW at r/s	hp at rpm	Nm at r/s	kpm at rpm
B 17 A	1979–1980	8.3:1	91 - 93	66/96	90/5750	132/42	13.5/2500
	1981–1984	8.3:1	91 - 93	66/92	90/5500	132/42	13.5/2500
B 19 A	1977–1978 [1]	8.8:1	97 - 98	71/90	97/5400	157/53	16.0/3200
	1977–1978 [2]	8.5:1	91 - 93	66/83	90/5000	152/42	15.5/2500
	1979–1980 [3]	8.5:1	91 - 93	66/83	90/5000	152/42	15.5/2500
	1979–1980 [2]	8.5:1	91 - 93	71/90	97/5400	157/53	16.0/3200
	1981–1984	8.5:1	91 - 93	71/92	97/5500	154/42	15.7/2500
B 19 K	1984	10.0:1	98	74/90	101/5400	160/40	16.3/2400
B 19 E	1977–1980	8.8:1	97-98	86/100	117/6000	157/75	16.0/4500
	1981	8.8:1	97-98	86/100	117/6000	150/75	15.3/4500
	1982–1983	9.2:1	91-93	86/100	117/6000	150/75	15.3/4500
	1984	10.0:1	98	86/100	117/6000	158/50	16.1/3000
B 19 ET	1982–1985	7.5:1	98	107/92	145/5500	226/63	23.0/3750
B 21 A	1975	8.5:1	91-93	71/83	97/5000	170/42	17.3/2500
	1976–1978	8.5:1	91-93	74/88	100/5250	170/50	17.3/3000
	1979–1980 [4]	8.5:1	91-93	74/88 [4]	100/5250 [4]	168/42	17.1/2500
	1979–1980 [5]	8.5:1	91-93	74/88	100/5250	169/42	17.2/2500
	1979–1980 [6]	9.3:1	97-98	79/92	107/5500	170/42	17.3/2500
	1981–1983 [7]	9.3:1	96 [7]	78/88	106/5250	172/42	17.5/2500
	1981–1983 [8]	8.5:1	91-93	75/88	102/5250	168/42	17.1/2500
	1981–1983 [9]	9.3:1R9	98	79/92	107/5500	170/42	17.3/2500
	1983–1984 [a]	.3:1	97	78/88	106/5250	172/43	17.5/2600
	1984 [b]	9.3:1	96	78/88	106/5250	172/42	17.5/2500
	1984 [c]	10.0:1	98	75/88	102/5250	170/50	17.3/3000

[1] Italy
[2] Others
[3] Germany, Austria
[4] Sweden, Overseas; 1980=75 kW (102hk)
[5] Australia
[6] Europe (except Sweden)
[7] Sweden, Australia. Also applies to Switzerland 1983; Australia 97 - 98 octane
[8] Norway, Overseas
[9] Europe (except Sweden and Norway)
[a] Canada
[b] Scandinavia, Switzerland, Australia
[c] Other markets

Engine variant		Comp. ratio	Rec. octane RON	Power (DIN)		Max. torque (DIN)	
				kW at r/s	hp at rpm	Nm at r/s	kpm at rpm
B 21 E	1975–1980	9.3:1	91-93	90/92	123/5500	170/58	17.3/3500
	1981–1983	9.3:1	91-93	90/92	123/5500	162/58	16.5/3500
B 21 ET	1981–1985	7.5:1	98	114/92	155/5500	240/63	24.5/3750
B 21 F	1975–1980	9.3:1	91	83/88	113/5250	164/42	16.7/2500
	1981–1982	9.3:1	91	83/92	113/5500	160/42	16.3/2500
	1981–1982 [4]	9.3:1	91	77/83	105/5000	160/50	16.3/3000
B 21 FT	1981–1985	7.5:1	91	98/90	133/5400	210/63	21.4/3750
B 23 A	1981–1984 [1]	10.3:1	98	82/83	112/5000	185/42	18.9/2500
	1982–1984 [2]	9.0:1	91-93	78/83	106/5000	179/42	18.2/2500
B 23 E	1979–1980	10.0:1	97-98	103/96	140/5750	191/75	19.5/4500
	1981–1983	10.0:1	97-98 [3]	100/92	136/5500	190/75	19.4/4500
	1984	10.3:1	96	95/88	129/5250	190/50	19.4/3000
	1984	10.0:1	98	96/90	131/5400	190/60	19.4/3600
B 23 F	1983	10.3:1	91	85/90	116/5400	180/58	18.3/3500
	1984	9.5:1	91	83/90	113/5400	184/46	18.8/2750

[1] Europe, Canada

[2] Overseas

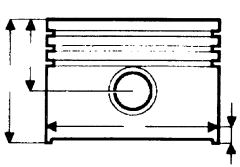
[3] Sweden, Switzerland, 96 octane.

4) B 21 F - MPG

Group 21 Engine block

Cylinder head		
Height, new	mm	146.1
min. after grinding	mm	145.6
Max. warp		
along	mm	0.50
across	mm	0.25
Cylinder head gasket thickness,		
unloaded	mm	1.3
loaded	mm	1.2

Cylinder block		B 17, B 19	B 21	B 23
Cylinder bore (D)				
Standard (C-marked)	mm	88.90 - 88.91	92.00 - 92.01	96.00 - 96.01
(D-marked)	mm	88.91 - 88.92	92.01 - 92.02	96.01 - 96.02
(E-marked)	mm	88.92 - 88.93	92.02 - 92.03	96.02 - 96.03
(G-marked)	mm	88.94 - 88.95	92.04 - 92.05	96.04 - 96.05
Oversize 1	mm	89.29	92.5	96.3
2	mm	89.67	93.0	96.5



Engine type	Weight*	mm		
	in grams	A	B	C
B 17 A	530 ± 6	75.5	50.5	7
B 19 A	505 ± 6	71.0	46.0	7
B 19 E –1983	515 ± 6	71.0	46.0	7
B 19 E 1984, B 19 K	515 ± 6	73.9	46.7	7
B 19 ET	510 ± 6	71.0	46.0	7
B 21 A, type 1	555 ± 6	71.0	46.0	6
type 2	555 ± 6	71.7	46.7	7
B 21 E	555 ± 6	71.0	46.0	6
B 21 ET	535 ± 6	71.5	46.5	7
B 21 F	555 ± 6	71.5	46.5	7
B 21 FT	535 ± 6	71.5	46.5	7
B 23 A	570 ± 7	76.4	46.4	8
B 23 E, type 1	555 ± 6	80.4	46.4	15
type 2	570 ± 7	76.4	46.4	8
B 23 F	570 ± 7	76.4	46.4	8

Max. weight diff. between pistons in same engine = 12 grams

Pistons		
Piston diameter (D) (measured at right angles to gudgeon pin hole, measurement C from the lower edge)		
Piston clearance, new piston		
B 17A, B 19 A/E/K, B 21 A/E/F	mm	0.01 - 0.04
B 19 ET	mm	0.03 - 0.06
B 21 ET/ET	mm	0.02 - 0.04
B 23 A	mm	0.01 - 0.04
B 23 E, variant 1	mm	0.05 - 0.07
variant 2	mm	0.01 - 0.04
B 23 F	mm	0.01 - 0.04
Piston clearance, use piston max.	mm	0.08
Piston rings, height		
• upper comp. ring, variant 1	mm	1.978 -1.990
variant 2	mm	1.728 -1.740
• lower comp. ring	mm	1.978 - 1.990
• oil scraper ring, variant 1	mm	4.74
variant 2	mm	3.978 - 3.990
Piston rings, axial play (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	0.030 - 0.062
Piston rings, gap (measured in cylinder)		
• upper comp. ring	mm	0.35 - 0.65
• lower comp. ring	mm	0.35 - 0.55
• oil scraper ring	mm	0.25 - 0.60
Gudgeon (piston) pin		
• Diameter, standard	mm	24.00 $^{+0}_{-0.004}$
oversize	mm	24.05 $^{+0}_{-0.004}$
• Length	mm	60.00

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

Valve system

Valve clearance, checking (adjustment)

• cold engine	mm	0.30 - 0.40(0.40)
• hot engine	mm	0.35 - 0.45(0.45)
Adjustment washers (in 0.05 intervals)	mm	3.30 - 4.50

Valve tappets

diameter	mm	36.975 - 36.995
height	mm	30.00 - 31.00
clearance valve tappets - cylinder head	mm	0.030 - 0.075

Valve springs

A, E and K engines B 19 ET, B 21 ET, B 21 F, early variants			B 19 ET, B 21 ET, B 21 F, B 21 FT, late variants. B 23 F		
Ø mm	Length mm	Load. N(kp)	Ø mm	Length mm	Load N (kp)
32.5	45.0	0	25.9	45.5	0
	38.0	280-320 (28-32)		38.0	280-320 (28-32)
	27.0	710-790 (71-79)		27.5	702-782 (70-78)

Valve guides		Intake valve	Exhaust valve
Length	mm	52.0	52.0
Inner diameter	mm	8.000 - 8.022	8.000 - 8.022
Pressing in height	mm	15.4 - 15.6	17.9 - 18.1
Play, valve spindle – guide (measured with new valve)			
new	mm	0.03 - 0.06	0.06 - 0.09
max.	mm	0.15	0.15

Valve guides available in 3 oversizes and marked with grooves.	**Size**	**Marking**	**Reamer**
	Standard	No groove	–
	O/s 1	1 groove	999 5161
	O/s 2	2 grooves	999 5162
	O/s 3	3 grooves	999 5163

Valve seats		**Intake**	**Exhaust**	
			A, E, F	**Turbo**
• diameter, standard	mm	46.00	38.00	38.00
oversize 1	mm	46.25	38.25	38.25
oversize 2	mm	46.50	38.50	38.50
• matching surface width	mm	1.3 - 1.9	1.7 - 2.3	1.7 - 2.3
• matching surface angle	°	45	45	45
• reduction angle,				
upper	°	15	15	15
lower	°	70	70	70
• seat position in cylinder head				
diameter, standard	mm	45.83	37.83	37.83
oversize 1	mm	46.08	38.08	38.08
oversize 2	mm	46.33	38.33	38.33
interference	mm	0.17	0.17	0.17
Valves				
Note! The Turbo exhaust valves are stellite coated and must not be machine ground.				
• diameter, disc	mm	44.00	35.00	35.00
stem, new	mm	7.955 - 7.970	7.945 - 7.960	7.945 - 7.960*
min.	mm	7.935	7.925	7.925 *
stem, new	mm			7.965 - 7.980**
min.	mm			7.945 **
• total length	mm			
• max machining valve stem	mm	0.4	0.4	0.4
• height, disc edge, new	mm	1.5	1.5	1.5
min after machining	mm	1.2	1.2	
• sealing angle	°	44.5	44.5	44.5

* Measured 32 mm under the valve disc

** Measured 16 mm from the valve spindle end

Timing gear

Engine variant	Camshaft		Checking camshaft adjustment	
	profile	max. lift height	Valve clearance at check mm	Intake valves to open at° btdc
B 17 A, B 19 A	A	10.5	0.7	13
B 19 K	L	9.8	0.7	10
B 19 E, 1977–1983	D	11.2	0.7	15
1984	A	10.5	0.7	13
B 19 ET	T	9.9	0.7	4
B 21 A, 1975–1983	A	10.5	0.7	13
1984 Switzerland, Nordic countries, Australia	A	10.5	0.7	13
Others	L	9.8	0.7	10
B 21 E	D	11.2	0.7	15
B 21 ET	T	9.9	0.7	4
B 21 F- 5	B	10.6	0.7	19
B 21 F- 8	M	9.5[1] / 10.5[2]	0.7	3[3] / 48[4]
B 21 F- 9	L	9.8	0.7	10
B 21 FT	T	9.9	0.7	4
B 23 A	A	10.5	0.7	13
B 23 E, 1979–1980	H	12.0	0.5	28
1981–1982	K	11.95	0.5	22.6
1983 Canada	A	10.5	0.7	13
Others	K	11.95	0.5	22.6
1984	A	10.5	0.7	13
B 23 F	M	9.5[1] / 10.5[2]	0.7	3[3] / 48[4]

[1] inlet valve
[2] exhaust valve
[3] inlet valve, atdc
[4] exhaust valve, btdc

Camshaft

Diameter, pivot pins	mm	29.95 - 29.97
bearings	mm	30.00 - 30.02
Radial play, new	mm	0.030 - 0.071
max.	mm	0.15
Axial play	mm	0.1 - 0.4

Timing gears

No. of teeth, crankshaft gear		19
countershaft gear		19
camshaft gear		38
No. of teeth on timing belt		123

Countershaft

Diameter, pivot pin, front	mm	46.975 - 47.000
intermediate	mm	43.025 - 43.050
rear	mm	42.925 - 42.950
Radial play	mm	0.020 - 0.075
Axial play	mm	0.20 - 0.46

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, radial play	mm	0.024 - 0.070
axial play	mm	0.15 - 0.35
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
Crankshaft width for flange bearing shell,		
standard	mm	38.960 - 39.000
oversize 1	mm	39.061 - 39.101
oversize 2	mm	39.163 - 39.203
Connecting rod bearing journals		
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		
Axial play at crankshaft	mm	0.15 - 0.35
Length, centre-to-centre	mm	145 ± 0.1
Max. weight diff. between connecting rods in the same engine	g	10
Flywheel		
Axial runout, max. per 150 mm diameter	mm	0.05

Tightening torque

Applies to greased nuts and bolts.	Nm
Cylinder head (stage 1)	20
(stage 2)	60
(stage 3) angle-tighten	90°
Bolts should be tightened in sequence from the middle outwards.	
Main bearing cap	110
Connecting rod bearings, old bolts	63
new bolts	70
Camshaft cap	20
Camshaft pulley	50
Camshaft idler pulley	50
Crankshaft, centre bolt vibration damper, pulley	165
Flywheel/carrier plate (use new bolts)	70
Spark plugs	20 - 30

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

CO content, idle speed, A engines

Engine variant	Model year	CO-content %		Idle speed r/s (rpm)
		Adjustment	Check	
B 17 A	1979–1985	2.0	1.5 - 3.0	15.0 (900)
B 19 A	1977	3.0	2.0 - 4.0	14.2 (850)
	1978[2)]	2.5	2.0 - 3.5	15.0 (900)
	1978[1)]	2.0	1.5 - 3.0	15.0 (900)
	1979–1984	2.0	1.5 - 3.0	15.0 (900)
B 19 K	1984	1.5	1.0 - 2.5	15.0 (900)
B 21 A	1975–1977	2.5	1.5 - 4.0	14.2 (850)
	1978[3)]	2.0	1.5 - 3.0	15.0 (900)
	1978[4)]	4.5	3.5 - 5.5	15.0 (900)
	1978[1)]	2.5	2.0 - 3.5	15.0 (900)
	1979–1980[4)]	3.5	2.5 - 4.0	15.0 (900)
	1979–1980[1)]	2.0	1.5 - 3.0	15.0 (900)
	1981[5)]	3.5	2.5 - 4.0	15.0 (900)
	1981[1)]	2.0	1.5 - 3.0	15.0 (900)
	1982–1983[5)]	3.0	2.5 - 4.0	15.0 (900)
	1982–1983[1)]	2.0	1.5 - 3.0	15.0 (900)
	1984[5)]	3.0	2.5 - 4.0	15.0 (900)
	1984[6)]	2.0	1.5 - 3.0	15.0 (900)
	1984[1)]	1.5	1.0 - 2.5	15.0 (900)
B 23 A	1981–1984	2.0	1.5 - 3.0	15.0 (900)

1) Other,
2) Italy
3) Sweden
4) Australia, Canada
5) Canada
6) The Nordic countries, Switzerland, and Australia
7) The Nordic Countries, Switzerland

CO-content, idle speed, E and F engines

Engine variant	Model year	CO-content %		Idle speed r/s (rpm)	
		Adjustment	Check	Manual	Automatic
B 19/21 E	1975–1977	2.0	1.0 - 4.0	15.0 (900)	
	1978–1980	2.0	1.0 - 3.0	15.0 (900)	
	1981–1984	1.0	0.5 - 2.0	15.0 (900)	
B 19 ET	1982–1985	2.0	1.0 - 3.0	15.0 (900)	
B 21 ET	1981–1982	2.0	1.0 - 3.0	15.0 (900)	
	1983[8]	3.0	2.5 - 3.5	15.0 (900)	
	1983[9]	2.0	1.0 - 3.0	15.0 (900)	
	1984–1985	2.0	1.0 - 3.0	15.0 (900)	
B 23 E	1979–1980	2.0	1.0 - 3.0	15.8 (950)	
	1981–1984	1.0	0.5 - 2.0	15.0 (900)	
B 21 F- 5	1976	2.0[6]	1.7 - 2.3[6]	15.0 (900)	13.3 (800)
	1977 [3,4]	2.0[6]	1.7 - 2.3[6]	15.0 (900)	14.2 (850)
	1977 [1]	1.0	0.7 - 1.3	15.0 (900)	13.3 (800)
	1977 [2]	1.5[7]	1.2 - 1.8[7]	15.0 (900)	15.0 (900)
	1978 [3]	2.0	1.0 - 2.5	15.0 (900)	15.0 (900)
	1978 [1]	1.0	0.7 - 1.3	15.0 (900)	13.3 (800)
	1978 [2,4]	2.0[7]	1.0 - 2.5[7]	15.0 (900)	15.0 (900)
	1979 [3]	2.0	1.0 - 2.5	15.0 (900)	15.0 (900)
	1979 [1]	1.0	0.7 - 1.3	15.0 (900)	13.3 (800)
	1979 [2,4]	2.0	1.0 - 2.5	15.0 (900)	15.0 (900)
	1980 [3]	2.0	1.0 - 2.5	15.0 (900)	15.0 (900)
	1980 [4,5]	2.0[7]	1.0 - 2.5[7]	15.8 (900)	15.8 (950)
	1981–1984	1.0[7]	0.7 - 1.3[7]	15.0 (900)	15.0 (900)
B 21 F-8 *	1982	0.6	0.4 - 0.8[7]	12.5 (750)	12.5 (750)
B 21 F-9	1981–1982	1.0[7]	0.7 - 1.3[7]	12.5 (750)	12.5 (750)
B 21 FT	1981–1985	1.0[7]	0.7 - 1.3[7]	15.0 (900)	15.0 (900)
B 23 F *	1983–1984	0.6	0.4 - 0.8[7]	12.5 (750)	12.5 (750)

[1] USA Federal
[2] USA California
[3] Canada
[4] Japan
[5] USA
[6] Air pump disconnected and plugged
[7] HO2S Oxygen sensor disconnected
[8] The Nordic countries
[9] Others
* LH 2 system

Fuel system, carburettor engines

Fuel pump	
Fuel pressure measured at the same height as the pump at 16.6 r/s (1000 rpm) ..... kPa	15 - 27
Carburettor, SU-HIF 6	
Metering rod	BDJ
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 (rpm)	20.8 - 22.5 (1250-1350)
Carburettor, Solex (Zenith) 175 CD	
Metering rod, B 17/19, 1977–1980	B 1 EE
1981–	B 1 FE
B 21, 1975, early variant	B 2 BB
1975, later variant	B 1 ED
1976–1980	B 1 EE
1981– Nordic Countries, Australia	B 1 FD
Others	B 1 EE
Switzerland 1983–	B 1 FD
Needle valve, size ..... mm	2.0
Float level, front edge ..... mm	9 - 13
rear edge ..... mm	15 - 17
Temperature compensator marking	60 L
Clearance, damper piston ..... mm	1.0 - 1.8
Oil level in damper cylinder (below edge) ..... mm	6
Fast idle with choke control out 25 mm ..... r/s(rpm)	20.8 - 22.5 (1250-1350)

Carburettor, Pierburg (DVG) 175 CDUS	
Metering rod, B 21	PN
B 23	DC
Needle valve, size mm	2.5
Float level at an angle of approx 10 ° mm	7 - 9
Clearance, damper piston mm	0.5 - 1.5
Oil level in damper cylinder (below edge) mm	6
Fast idling	
with choke control out 25 mm r/s(rpm)	20.8 - 22.5 (1250-1350)
Carburettor, Solex-Cisac	
Main jet, stage 1	145
stage 2	140
Air correction jet, stage 1	160
stage 2	135
Idling fuel jet	43
Idling air jet (constant CO)	35
Part load enrichment jet	60
Float level	33.8
Fast idle (choke fully in)	
clearance between the cam and adjuster screw mm	1.9
Vacuum servo setting:	
-Choke fully out.	
-Vacuum servo push rod pressed fully in to bottom position.	
Adjust choke throttle opening to mm	3.1

Pressures		B 19/21 ET/FT 1981	B 19/21 ET/FT 1982–	B 19/21 E/F
System pressure	kPa	520 - 580	520 - 580	450 - 530
Shut-off pressure	kPa	150 - 240	240 - 320	150 - 240
Control pressure, hot engine	kPa	345 - 375	345 - 375	345 - 375
hot engine at system pressure 45 kPa	kPa	265 - 295	265 - 295	

Control pressure valve

Engine type	Bosch P/N	Volvo P/N	Control pressure, hot engine kPa		Resistance Ω
			engine turned off		
B 19 E, B 23 E	0 438 140 **004**	463 971-2	345 - 375		20 - 30
B 19 ET, B 21 ET	0 438 140 **082**	12 76 946-9	345 - 375	265 - 295*	20 - 30
B 21 E, 1975	0 438 140 **014**	12 19 159-9	345 - 375		20 - 30
1976–	0 438 140 **004**	463 971-2	345 - 375		20 - 30
B 21 F-5, 1976	0 438 140 **014**	12 19 159-9	345 - 375		20 - 30
1976 [4]	0 438 140 **021**	12 19 952-7	340 - 380		20 - 30
1977 [1]	0 438 140 **004**	463 971-2	345 - 375		20 - 30
1977 [4]	0 438 140 **021**	12 19 952-7	340 - 380		20 - 30
1977 [2]	0 438 140 **014**	12 19 159-9	345 - 375		20 - 30
1978–80	0 438 140 **004**	463 971-2	345 - 375		20 - 30
1981 [1]	0 438 140 **079**	12 76 878-4	345 - 375	145 - 175**	10 - 20
1981 [3]	0 438 140 **004**	463 971-2	345 - 375		20 - 30
B 21 F-9, 1981–	0 438 140 **079**	12 76 878-4	345 - 375	145 - 175**	10 - 20
B 21 FT, 1981–	0 438 140 **079**	12 76 878-4	345 - 375	145 - 175**	10 - 20

[1] USA [2] not USA [3] Japan

[4] Height compensation (stated pressure is for sea level)

* Hot engine and a system pressure of 45 kPa.

** On acceleration (cold engine but heated valve)

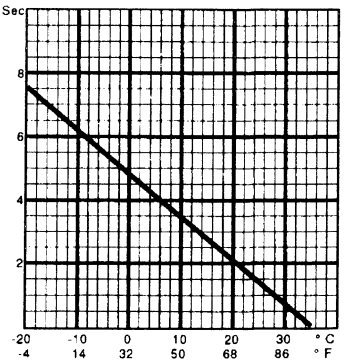
Cold start injector

Engine type	Model year	Bosch P/N	Volvo P/N	Injection volume cm^3/min
E/F	1975–79	0 280 170 404	462 865-7	115
	1980–	0 280 170 413	12 76 498-1	85
Turbo	1981	0 280 170 404	462 865-7	115
	1982–	0 280 170 415	12 69 585-4	135

Thermal time sensor

Cut off temperature and connection time at -20 ° C is stamped on the thermal time sensor hexagon.

Engagement time at different temperatures, see diagram.



Auxiliary air valve

Engine	Model year	Bosch P/N	Volvo P/N	Resistance	Fully open	Fully closed
B 19/21 E	1975–78	0 280 140 **106**	12 19 160-7	40 - 60 Ω	- 30 C	+ 70 C
	1979– *	0 280 140 **106**	12 19 160-7	40 - 60 Ω	- 30 C	+ 70 C
	1979– **	0 280 140 **114**	12 66 910-7	40 – 60 Ω	- 30 C	+ 70 C
B 19/21 ET	1981–	0 280 140 **106**	12 19 160-7	40 - 60 Ω	- 30 C	+ 70 C
B 21 F	1976–78	0 280 140 **100**	460 833-7	40 - 60 Ω	- 30 C	+ 70 C
	1979– *	0 280 140 **106**	12 19 160-7	40 – 60 Ω	- 30 C	+ 70 C
	1979– **	0 280 140 **114**	12 66 910-7	40 – 60 Ω	- 30 C	+ 70 C
B 23 E	1979–80	0 280 140 **114**	12 66 910-7	40 - 60 Ω	- 30 C	+ 70 C
	1981– *	0 280 140 **106**	12 19 160-7	40 – 60 Ω	- 30 C	+ 70 C
	1981– **	0 280 140 **114**	12 66 910-7	40 – 60 Ω	- 30 C	+ 70 C

* Manual transmission ** Automatic transmission

Injectors	B 19/21 E/F –1978	B 19/21 E/F 1979– B 21 F/FT, B 23 E	B 19/21 ET
Bosch P/N	0 437 502 **007**	0 437 502 **015**	0 437 502 **020**
Volvo P/N	463 972-0	12 76 037-7	13 06 499-3
Opening pressure ... kPa	300 - 360	320 - 380 (350 - 410)*	350 - 410
No leakage permitted below ... kPa	240	260 (290) *	290
* injectors with date code higher than 828			
Fuel pump	**1975–1979**	**1980–**	**B 19/21 ET 1981**
Bosch P/N	0 580 254 **996**	0 580 254 **949**	0 580 254 **984**
Volvo P/N	460 821-2	13 36 517-6	13 06 831-7
Capacity at 500 kPa, 12 V and + 20° C ... l/h	100	120	150
Current consumption, max ... A	9.5	9.5	9.5
Prepump			
Current consumption ... A	1 - 2		
Mass Air Flow (MAF) Sensor			
Sensor plate rest position (measured at max. control pressure) ... mm	0.3		

Fuel system MFI, injection engines (LH 2)

Engine type	System pressure kPa	Control module	
		Volvo P/N	Bosch P/N
B 21 F	250	13 06 940-6	0 280 000 **500**
B 23 F, 1983	250	13 17 029-5	0 280 000 **503**
1984	250	13 46 563-8	**510**

Group 26 Cooling system

General

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

This mixture helps prevent corrosion and damage by freezing.

- Never top up with only water. Use Genuine Volvo coolant diluted 50/50 with clean water.

- The coolant does not normally need to be changed. *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.

Approx volume litres		Expansion tank Pressure valve opens at		Thermostat* °C (°F)			
Manual	Auto-matic	Pos. pressure kPa	Neg. pressure kPa	Type	Marking	Starts opening	Fully open
9.5	9.3	65 - 85	7	1	82	82 (180)	92 (198)
				2	87	87 (189)	97 (207)
				3	92	92 (198)	102 (216)

Fan belts	Earlier types	Later types
Type 1	HC 38 x 925	HC 38 cog x 925
Type 2	HC 38 x 913	HC 38 cog x 913

Group 28 Distributor ignition (DI) system

General

Engine type	Model year	Ignition setting btdc		Spark plugs		
		11.7-13.3 r/s	41.7 r/s	Designation	P/N	Kit no.
B 17 A	1979–	12	28 - 32	W 7 DC	13 06 605-5	273 597-5
B 19 A	1977	15	32 - 36	W 7 DC	13 06 605-5	273 597-5
	1978 [1]	15	32 - 36			
	1978–80 [8]	12	28 - 32			
	1981–	10	26 - 30			
B 19 E	1977–83	8	28 - 33	W 6 DC	13 06 604-8	273 596-7
	1984	10	24 - 29			
B 19 ET	1982–	15	21 - 26	W 6 DC	13 06 604-8	273 596-7
B 19 K		7	23 - 27	W 7 DC	13 06 605-5	273 597-5
B 21 A	1975	12	24 - 28	W 7 DC	13 06 605-5	273 597-5
	1976–77	15	32 - 36			
	1978 [2]	12	28 - 32			
	1978 [8]	15	32 - 36			
	1979–80	12	28 - 32			
	1981–83 [3,4]	10	26 - 32			
	1981–83 [8]	12	28 - 32			
	1984– [3,5]	10	20 - 26			
	1984– [6]	7	17 - 23			
	1984 [4]	10	26 - 32			
B 21 E	1975–83	8	28 - 33	W 6 DC	13 06 604-8	273 596-7
B 21 ET	1981–	15	21 - 26	W 6 DC	13 06 604-8	273 596-7
B 23 A	1981–82 [2]	7	21 - 26	W 7 DC	13 06 605-5	273 597-5
	1982 [8]	5	19 - 24			
	1983– [6]	7	17 - 22			
	1983– [7]	5	19 - 24			
B 23 E	1979–83	5	25 - 30	W 6 DC *	13 06 604-8	273 596-7
	1984	10	24 - 29			

[1] Italy [2] Sweden [3] The Nordic countries [4] Australia [5] Switzerland [6] Europe
[7] Overseas [8] Others
* B 23 E 1979–1980 use WR 5 DC.

General

Engine type	Model year	Ignition setting btdc		Spark plugs		
		11.7-13.3 r/s	41.7 r/s	Designation	P/N	Kit no.
B 21 F	1976	15	25 - 30	W 7 DC	13 06 605-5	273 597-5
	1977 1)	12	28 - 32	W 7 DC	13 06 605-5	273 597-5
	1977 5)	15	25 - 30	W 7 DC	13 06 605-5	273 597-5
	1978	12	28 - 32	W 7 DC	13 06 605-5	273 597-5
	1979 2,4)	8	22 - 26	W 7 DC	13 06 605-5	273 597-5
	1979 5)	10	26 - 30	W 7 DC	13 06 605-5	273 597-5
	1980 3)	10	24 - 28	W 7 DC	13 06 605-5	273 597-5
	1980 5)	8	22 - 26	W 7 DC	13 06 605-5	273 597-5
	1981–84	8*	22 - 26	W 7 DC ***	13 06 605-5	273 597-5
B 21 FT	1981–84	12**	26 - 30	WR 7 DS		273 594-2
B 23 F	1983–84	12	18 - 22	WR 7 DS		273 594-2

1) USA 2) California 3) Canada 4) Japan 5) Others

* California adjust at 15 r/s (900 r/min)

** Adjust at 15 r/s (900 r/min)

*** USA must have WR 7 DS (same as B 21 FT)

Ignition coil

Volvo P/N	Manuf. P/N	Resistance of coils in Ω		
		primary (1 and 15)	secondary (1 and high)	Series resistance
A engines, –1978				
12 19 189-6	0 221 119 **028**	2.7 - 3.0	7 - 12	–
A engines, 1979–				
12 19 230-8	0 221 122 **006**	1.8 - 2.0	8 - 11	1.2 - 1.4
E/F engines, EI (electronic ignition) system				
12 19 230-8	0 221 122 **006**	1.8 - 2.0	8 - 11	0.8 - 1.0
F engines, EI (computer controlled) system				Capacitor
		1.1 - 1.3 1.1 - 1.3	10.5 - 10.7 7.7 - 9.3	50 - 250 nF –

Distributor			
Engine	**model year/market**	**Bosch**	**Volvo**
B 17 A	1979–1980	0 231 176 **103**	12 66 478-5
	1981–1984	0 231 170 **185**	12 19 661-4
B 19 A	1977	0 231 170 **185**	12 19 661-4
	1978, Italy	0 231 170 **185**	12 19 661-4
	Others	0 231 176 **103**	12 66 478-5
	1979	0 231 176 **103**	12 66 478-5
	1980, Thailand, Malaysia, Indonesia	0 231 170 **185**	12 19 661-4
	Others	0 231 176 **103**	12 66 478-5
	1981–1984	0 231 170 **185**	12 19 661-4
B 19 K	1984	0 231 170 **302**	13 32 410-8
B 21 A	1975	0 231 170 **134**	463 692-4
		0 231 170 **173**	12 19 625-9
	1976–1977	0 231 170 **185**	12 19 661-4
	1978, Sweden, Canada	0 231 176 **103**	12 66 478-5
	Others	0 231 170 **185**	12 19 661-4
	1979, Sweden, Australia, Canada, Overseas	0 231 176 **103**	12 66 478-5
	Others(incl. Thailand, Indonesia)	0 231 170 **185**	12 19 661-4
	1980, Sweden, Australia, Canada, Overseas	0 231 176 **103**	12 66 478-5
	Others (incl. Malaysia, Thailand, Indonesia)	0 231 170 **185**	12 19 661-4
	1981–1983, Canada	0 231 176 **103**	12 66 478-5
	Sweden, Australia, (1982– incl. Switz., Canada)	0 231 170 **284**	13 06 792-1
	Others	0 231 170 **185**	12 19 661-4
	1984, Europe	0 231 170 **302**	13 32 410-8
	Others	0 231 170 **284**	13 06 792-1
B 23 A	1981–1982	0 231 170 **287**	13 06 872-1
	1983–1984, Europe	0 231 170 **302**	13 32 410-8
	Others	0 231 170 **287**	13 06 872-1

Distributor			
Engine	**model year/market**	**Bosch**	**Volvo**
B 19 E,	1977–1983	0 237 002 **017**	12 19 957-6
	1984	0 237 002 **039**	12 76 403-1
B 19 ET	1982–1984	0 237 003 **027**	12 76 701-8
B 21 E	1975	0 237 002 **001**	463 832-6
	1976, Sweden, Australia	0 237 002 **010**	12 19 662-2
	Others	0 237 002 **001**	463 832-6
	1977–1980, Sweden, Australia, Overseas 1979–	0 237 002 **010**	12 19 662-2
	Others (incl. Thailand 1979–)	0 237 002 **017**	12 19 957-6
	1981–1982	0 237 002 **017**	12 19 957-6
B 21 ET	1981–1984	0 237 003 **027**	12 76 701-8
B 23 E	1979–1982	0 237 002 **017**	12 19 957-6
	1983, Canada	0 237 002 **039**	12 76 403-1
	Others	0 237 002 **017**	12 19 957-6
	1984	0 237 002 **039**	12 76 403-1
B 21 F	1976	0 237 002 **007**	463 694-0
	1977, USA	0 237 003 **003**	12 19 848-7
	Canada, Japan	0 237 002 **007**	463 694-0
	1978, California, Canada, Japan	0 237 003 **009**	12 66 466-0
	Others	0 237 003 **003**	12 19 848-7
	1979, California, Japan (Canada –1980)	0 237 002 **039**	12 76 403-1
	Others	0 237 002 **038**	12 66 904-0
	1980–1982, USA, Japan, (Canada 1981–1982)	0 237 002 **039**	12 76 403-1
	1983–1984, Japan	0 237 002 **039**	12 76 403-1
	Chrysler distributor ignition (DI) system:		
	1981–1982	521 3065	13 06 059-5
B 21 FT	1981–1984	0 237 003 **024**	12 76 703-4
B 23 F	1983	0 237 032 **001**	12 32 684-8
	1984–1985	0 237 506 **001**	12 32 587-2
	Chrysler ignition system:		
	1983	0 237 032 **001**	13 32 684-8
	1984	0 237 506 **003**	13 36 737-0