

## Section 2 Engine

## Group 20 General

## Performance, compression ratio, octane no.

Engine type (Compression ratio)	Recommended octane number	Power		Maximum torque	
		kW / r/s	hp / rpm (hp / rpm)	Nm / r/s	kpm / rpm (ft.lbf / rpm)
B 5204 T3 (8.4:1)	95-98	166 / 95	225 / 5700 (222 / 5700)	310 / 45-85	31.6 / 2700-5100 (229 / 2700-5100)
B 5204 T4 (8.4:1)	95-98	120/85	163/5100	230/ 30-83	23.5/ 1800-5000
B 5234 T3 (8.5:1)	95-98	176 / 90	240 / 5400 (236 / 5100)	330 / 45-92	33.6 / 2400-5100 (243 / 2400-5100)
B 5254 T (9.0:1)	95	142 / 85	193 / 5100 (190 / 5100)	270 / 30-83	27.5 / 1800-5000 (199 / 1800-5000)
B 5254 S (10.3:1)	95	125/102	170 / 6100 (168 / 6100)	220 / 78	22.4 / 4700 (162 / 4700)
B 5244 S (10.3:1)	98	125/95	170 / 5700 (168 / 5700)	230 / 75	23.5 / 4500 (170 / 4500)
B5244 T (9.0:1)	95	142/85	193 / 5100	270 / 27-83	27.5 / 1800-5000 (199 / 1800-5000)

Use only **unleaded petrol**.

Can be driven on 91 octane unleaded.

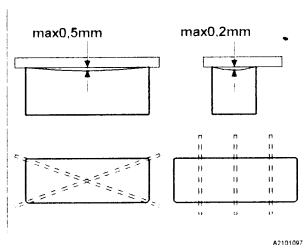
## Other general data

	B 5204 T3/T4	B 5234 T3	B 5254 T/S B 5244 T/S
No. of cylinders .....	5	5	5
Bore ..... mm	81.0	81.0	83.0
Stroke ..... mm	77.0	90.0	90.0
Cylinder displacement ... litres	1.984	2.319	2.435
Firing order .....	1-2-4-5-3	1-2-4-5-3	1-2-4-5-3
Weight, unit*, approximately . kg	173-190	176-190	173
* including auxiliary equipment and oil			144-156 applies B 5244 S

	B 5204 T3/T4, B 5234 T3, B 5254 T, B 5244 T	B 5254 S, B 5244 S
Compression ..... Mpa	1.1 - 1.3	1.3 - 1.5
Maximum difference between highest / lowest ..... MPa	0.2	0.2

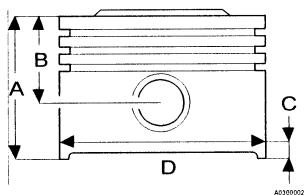
## Group 21 Cylinder block

## Technical data and tightening torques:



B 5204 T3/T4, B 5234 T3, B 5254 T/S, B 5244 T/S	
Cylinder head:	Dimensions mm
Height, new	129.0 ± 0.05
Maximum machining	0.30
Maximum distortion, front-rear	0.50
Maximum distortion, lateral	0.20

Cylinder block:	B 5204 T3/T4, B 5234 T3,	B 5254 T/S B5244 T/S
Cylinder diameter		
Standard (marked C) .....	mm 81.00 - 81.01	83.00 - 83.01
Standard (marked D) .....	mm 81.01 - 81.02	83.01 - 83.02
Standard (marked E) .....	mm 81.02 - 81.03	83.02 - 83.03
Standard (marked G) .....	mm 81.04 - 81.05	83.04 - 83.05
Over size 1 .....	mm 81.20 - 81.21	83.20 - 83.21
Over size 2 .....	mm 81.40 - 81.41	83.40 - 83.41



Pistons			
Engine type:	Measurement (mm)		
	A	B	C
B 5204 T3/T4	66.4	42.4	16.0
B 5234 T3	59.9	35.9	16.0
B 5254 T/S	59.9	35.9	16.0
B 5244 T	59.9	35.9	16.0
B 5244 S	50.0	28.0	12.0

Classification of the main bearings (stamped on the cylinder block and crankshaft):						
Block	A small diameter		B medium diameter		C large diameter	
	block	intermedi- ate section	block	intermedi- ate section	block	intermedi- ate section
A small	yellow medium	yellow medium	yellow medium	blue thick	blue thick	blue thick
B medium	red thin	yellow medium	yellow medium	yellow medium	yellow medium	blue thick
C large	red thin	red thin	red thin	yellow medium	yellow medium	yellow medium

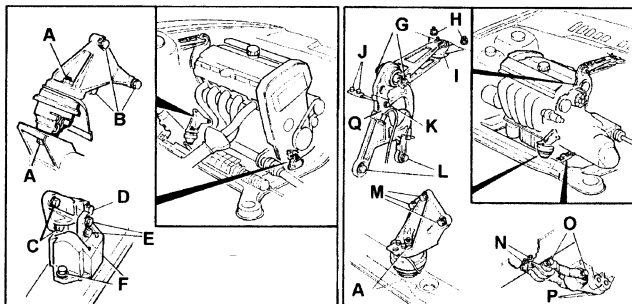
	Nm / ft.lb. And angle- tightening degrees:
Tightening torques for lubricated screws and nuts: B5XX4 T/S	
Cylinder head (tighten the screws in sequence from the centre outwards):	
step 1 .....	20/15
step 2 .....	60/44
step 3 ..... angle-tighten	130°
Intermediate section (tighten the screws in sequence from the centre outwards):	
step 1, M10 .....	20/15
step 2, M10 .....	40/30
step 3, M8 .....	25/18
step 4, M7 .....	16/12
step 5, M10 ..... angle tighten	90°
Connecting rod cap:	
step 1 .....	20/20
step 2 ..... angle-tighten	90°
Crankshaft centre nut .....	180/133
Flange screw, vibration damper:	
step 1 .....	25/19
step 2 ..... angle-tighten	30°
Carrier plate	
step 1 .....	45/33
step 2 ..... angle-tighten	50°
Gearbox - engine .....	48/35
Torque converter .....	50/37
Timing cover, front .....	12/9



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**Group 21 Cylinder block**

Tightening torques for lubricated screws and nuts: B5XX4 T/S		Nm / ft.lb. And angle-tightening degrees:
Flywheel:		
step 1 .....		45/33
step 2 .....	angle-tighten	65°



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Tightening torques for the engine mountings, screws and nuts (oiled):		Nm / ft.lb. And angle-tightening degrees:
A	Nut (screw) for the engine pad .....	50/37
B	Rear engine mounting - gearbox .....	50/37
Right engine mounting:		
C	Rear screws - cylinder block, M10	
	Step 1, M10 .....	35/26
	Step 2, M10 .....	60°
	angle tighten	
D	Front screw - engine block:	
	Step 1, M8 .....	20/15
	Step 2, M8 .....	60°
	angle-tighten	
E	Engine pad - engine mounting:	

Tightening torques for the engine mountings, screws and nuts (oiled):		Nm / ft. lb. And angle-tightening degrees:
F	Step 1 .....	35/26
	Stage 2 ..... angle-tighten	90°
	Engine pad - frame ..... angle-tighten:	
	Step 1 .....	65/48
G	Step 2 ..... angle-tighten	60°
	Upper torque rod.	
	Front bushing:	
	Step 1 .....	35/26
H	Step 2 ..... angle-tighten	90°
	Rear bushing - body:	
	Step 1 .....	35/26
	Step 2 ..... angle-tighten	60°
I	Rear bushing - torque rod:	
	Step 1 .....	35/26
	Step 2 ..... angle-tighten	60°
	Stay - cylinder head .....	10/7.5
K	Stay - torque control arm .....	25/18
L	Torque control arm - cylinder block:	
	Step 1 .....	45/33
	Step 2 ..... angle-tighten	90°
	M	Front engine mounting - cylinder block .....
N	Lower torque rod.	
	Front bushing - frame, M12:	
	Step 1 .....	65/48
	Step 2 ..... angle-tighten	60°
O	Torque rod - bushings:	
	Step 1 .....	35/26
	Step 2 ..... angle-tighten	90°
	P	Rear bushing - gearbox:
Step 1 .....		35/26
Step 2 ..... angle-tighten		40°
Q		Torque control arm - cylinder head (Turbo):

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Group 21 Cylinder block

Tightening torques for the engine mountings, screws and nuts (oiled):		Nm / ft.lb. And angle-tightening degrees:
Step 1 .....	.....	35/26
Stage 2 .....	..... angle-tighten	60°

### Group 22 Lubrication system

#### General

Oil capacity and grade, see Section: 1  
Service and maintenance, Group 16:  
Lubrication.

Oil pressure, applies to an engine at operating temperature with a new oil filter:

Oil pressure: Engine at operating temperature, thermostat open and new oil filter. Engine speed r/s (rpm)		5-cylinder engines
14 (810), minimum .....	MPa	0.1
67.7 (4000), minimum .....	MPa	0.35
Relief valve: The relief valve opens at a pressure of .....	Mpa	0.48
Maximum oil pressure .....	MPa	0.7
Oil pressure sensor: Breakpoint, indicator lamp goes out at a pressure .....	MPa	0.04 - 0.06

### Group 25 Intake and exhaust system

Engine version	B 5204 T3/T4 B 5234 T3	B 5254 T B5244 T
Initial boost pressure, without electronic control at full load, 20°C, 3000 rpm .....	kPa	35 ± 5
Maximum boost pressure, with electronic control at full load, 20°C, 5100 rpm .....	kPa	66 ± 7
		25 - 32
		36 - 50

Tightening torques	Nm
Exhaust manifold, cylinder head side .....	23
Exhaust manifold - heat shield .....	15
Exhaust manifold - turbocharger (TC), nuts .....	25
Exhaust manifold - turbocharger (TC), studs .....	20
Exhaust system, pipe to turbocharger (TC) .....	30
Exhaust system, flange front - rear pipe .....	25
Exhaust system, pipe to exhaust manifold .....	10
Intake pipe .....	17

### Group 26 Cooling system

#### General

Never top up with water only. Use Volvo original **green coolant** (see table below) diluted 50/50 with **clean water**. This mixture will prevent corrosion and freezing.



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## Group 26 Cooling system

**General**

The coolant does not usually need replacing. In the case of larger repairs when coolant needs to be drained, new coolant must be used because the old has been exposed to oxidation and dirt.

Clean the cooling system when replacing coolant.

Use cleaning agent 11 61 328.

Green coolant:	Volvo P/N
1 litre, cold market .....	13 81 076
5 litre, cold market .....	13 81 077
1 litres, EU, rest of the world .....	13 81 078
5 litres, EU, rest of the world .....	13 81 079
210 litres, world-wide .....	13 81 080
1 gal (3,785 litres), USA .....	13 81 081
5 litre, ready-mixed 50/50, Australia .....	13 81 082

Engine type:	Volume litres	Expansion tank pressure valve opens at:		Thermostat °C (°F)		
		Over pressure kPa	Negative pressure kPa	Marking	Starts to open	Fully open
B 5204 T3/T4 B 5234 T3 B 5254 S	7.0	150	7	87 (189)	87 (189)	102 (216)
B 5254 T	7.2	150	7	90 (194)	90 (194)	105 (220)
B 5244 T	8.0	150	7	90(194)	90(194)	105(221)

## Group 28 Ignition system

## General

Engine type:	Ignition system	Ignition timing* (bt/dc)	Engine speed rpm
B 5204 T3/T4, -98	Motronic 4.4	$6^{\circ} \pm 2^{\circ}$	$850 \pm 50$
B 5234 T3, -98	Motronic 4.4	$6^{\circ} \pm 2^{\circ}$	$850 \pm 50$
B 5254 T, -98	Motronic 4.4	$10^{\circ} \pm 2^{\circ}$	$850 \pm 50$
B 52xx T, 99-	ME7	$8^{\circ} \pm 2^{\circ}$	$850 \pm 50$
B 5254 S	DENSO	$10^{\circ} \pm 2^{\circ}$	$850 \pm 50$
B 5244 S	DENSO	$5^{\circ} \pm 2^{\circ}$ manual $12^{\circ} \pm 2^{\circ}$ automatic	$850 \pm 50$

\* Cannot be adjusted, only checked.

## Group 28 Components

## Technical data and tightening torques:

Component:		
Ignition coil, ignition discharge module ME 7 .....	Volvo P/N	91 25 601
Ignition coil, ignition discharge module DENSO .....	Volvo P/N	91 25 601
Ignition coil, ignition discharge module .....	Volvo P/N	12 75 174
Resistance in windings, 1 and 15 .....	$\Omega$	0.5 - 1.5
Resistance in windings, 1 and HT .....	$k\Omega$	8 - 9
Spark plugs:		
B 52xx T .....	Volvo kit no.	272 313
B 5254 S .....	Volvo kit no.	272 372
Spark gap:		
B 52xx T .....	mm	0.75
Spark plug with three electrodes:		
Tightening torques .....	Nm (ft lb)	25 (18)
Distributor arm, rotor .....	Volvo P/N.	13 67 783
Resistance .....	$k\Omega$	1.1 - 1.3
Ignition cables:		
Ignition coil - distributor .....	Volvo P/N	13 35 874
Resistance .....	$k\Omega$	$2.4 \pm 20\%$
Distributor - spark plugs .....	Volvo P/N	91 35 700
Resistance, cylinder 1 .....	$k\Omega$	$4.5 \pm 20\%$
Resistance, cylinder 2 .....	$k\Omega$	$4.0 \pm 20\%$

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## Group 28 Components

Component:		
Resistance, cylinder 3 .....	k $\Omega$	3.3 $\pm$ 20%
Resistance, cylinder 4 .....	k $\Omega$	2.9 $\pm$ 20%
Resistance, cylinder 5 .....	k $\Omega$	2.3 $\pm$ 20%
Knock sensor .....	Volvo P/N	See VADIS
Tightening torques .....	Nm (ft.lb)	20 (15)
Engine speed and position sensor, flywheel .....	Volvo P/N	12 75 599
Resistance in coil, at 20C <sup>o</sup> /68F degrees .....	$\Omega$	125 $\pm$ 25
Inductance in coil, at 20C <sup>o</sup> /68F degrees .....	mH	85 $\pm$ 10 (1 kHz)
Camshaft position (CMP) sensor, early version .....	Volvo P/N	91 46 108
Camshaft position (CMP) sensor, late version .....	Volvo P/N	92 02 134
Relay, engine cooling fan (FC) .....	Volvo P/N	13 98 845
Resistance in coil .....	$\Omega$	80
Relay, A/C .....	Volvo P/N	See VADIS