Section 2 Engine

Group 20 General

Performance and other data, petrol and diesel engines:

Engine type: (Geometric compression ratio)	Fuel: Recommended Octane rating*. Diesel: Cetane rating.	Power:		Maximum torque:
		kW at rps	hp / rpm	Nm / rpm
B5254 T2 (9.0:1)	95	154 / 83	210 /5000	320 / 1500-4500
B6294 T (8.5:1)	95	200 / 85	272 / 5100	380 / 1800-5000
D 5244 T (18.0:1)	Cetane rating: 51	120 / 67	163 / 4000	340 / 1750-3000

* Use only **unleaded petrol.**

Can also be driven on 91-98 octane petrol.

For best performance and minimum fuel consumption use 98 octane unleaded petrol.

Other general data

Engine type:	B5254 T2 Engine code 59	B6294 T Engine code 91	D5244T Engine code 79
No. of cylinders	5	6	5
Cylinder diameter mm (inches)	83	83	81 (3.19")
Cylinder stroke mm (inches)	93.2 (3.67")	90 (3.54")	93.2 (3.67")
Cylinder displacement litres	2.521	2.922	2.401
Firing order	1-2-4 -5-3	1-5-3 -6-2-4	1-2-4 -5-3
Engine speed, idle speed rpm	670	650	700
Engine speed, max rpm	6800	6200	4600
Weight, gross, including auxiliary equipment and oil etc. kg (lb.)	163-176 (359-388)	166-188 (366-415)	185/(407)

Group 21 Cylinder block

Tightening torques for petrol engines: B 6294 T, cylinder block

Tightening torques for lubricated screws and nuts:		Nm / lbf.ft.
Cylinder head:		
Tighten the screws in sequence from the centre outwards.		
Stage 1		20/15
Stage 2		60/44
Step 3	angle-tighten	130°
Intermediate section:		
Tighten the screws in sequence from the centre outwards.		
Stage 1, M10		20/15
Stage 2, M10		45/33
Stage 3, M8		25/19
Stage 4, M7		17/14
Step 5, M10	angle tighten	90°
Connecting rod cap:		
Stage 1		30 ± 3/22 ± 2
Step 2	angle-tighten	90°
Crankshaft centre nut		300/221
Flange screw, vibration damper:		
Stage 1		35/26
Step 2	angle-tighten	50°
Carrier plate:		
Stage 1		45/33
Step 2	angle-tighten	50°
Gearbox - engine		48/35
Torque converter		50/37
Camshaft pulley		20/15
Timing gear pulley, camshaft without VVT		20/15
Timing gear pulley, camshaft with VVT		10/7.4
Camshaft pulley with VVT, centre screw		120/89
Camshaft pulley with VVT, centre plug		35/26
Tension pulley, timing belt		30/22
Belt tensioner		25/19
Vibration damper, timing belt		24/18
Idler pulley, timing belt		25/19
Timing cover, front		12/9
Timing cover, upper		8/6

Tightening torques for lubricated screws and nuts:	Nm / lbf.ft.
Water pump	17/13
Exhaust bend to the turbocharger (TC)	24/18
Manifold (cylinder head side)	25/19
Turbocharger (TC) unit to manifold	25/19
Studs at exhaust port, manifold, turbocharger (TC)	20/15
Intake manifold, joint upper / lower section	19/14
Intake manifold, cylinder head side	20/15
Fuel rail:	
Stage 1	10/7.4
Step 2 angle-tighten	75°
Sump	17/13
Sump plug	38/28
Oil intake line	17/13
Oil trap	15/11
Oil filter, environmental filter	35/26
Oil pressure switch	50/37
Dip stick	10/7.4
Pressure control valve, oil duct piston cooling	35/26
Drain hose, turbocharger (TC)	12/9
Pipe screw, crankcase ventilation	26/19
Pipescrews, coolant pipes, turbocharger (TC)	26/19
Pipe screw, oil pressure pipes, turbocharger (TC)	18/13
Pipe screw, oil pressure pipes, cylinder block	38/28
Plug, gauge hole, crankshaft adjustment	38/28
Engine speed (RPM) sensor, flywheel	10/7.4
Knock sensor (KS)	20/15
Camshaft position (CMP) sensor	10/7.4
Temperature sensor, engine coolant	22/16
Spark plugs	30/22
Flywheel:	
Stage 1	45/33
Step 2 angle-tighten	65°
Piston cooling valve	35
Plug for gauging valve clearance	20
Plug gauge hole / crankshaft seal	38

Tightening torques for petrol engines: B 52XX XX, Cylinder block

Tightening torques for lubricated screws and nuts:	Nm / lbf.ft.
Cylinder head (tighten the screws in sequence from the centre outwards):	
Stage 1	20/15
Stage 2	60/44
Step 3 angle-tighten	130°
Intermediate section:	
Tighten the screws in sequence from the centre outwards.	
Stage 1, M10	20/15
Stage 2, M10	45/33
Stage 3, M8	24/18
Stage 4, M7	17/13
Step 5, M10 angle tighten	90°
Connecting rod cap:	
Stage 1	30 ± 3/22 ± 2
Step 2 angle-tighten	90°
Crankshaft centre nut	180/133
Flange screw, vibration damper:	
Stage 1	25/19
Step 2 angle-tighten	60°
Carrier plate:	
Stage 1	45/33
Step 2 angle-tighten	50°
Gearbox - engine	48/35
Torque converter	50/37
Engine mounting Right side, cylinder block:	
Step 1 M10x35	35/26
Step 2 M10x35 angle tighten	60°
Step 1 M8x23	20/15
Step 2 M8x23 angle-tighten	60°
Timing cover, front	12/9
Timing cover, upper	8/6
Camshaft pulley	25/19
Timing gear pulley, camshaft without VVT	20/15
Timing gear pulley, camshaft with VVT	10/7.4
Camshaft pulley with VVT, centre screw	120/89
Camshaft pulley with VVT, centre plug	35/26

Tightening torques for lubricated screws and nuts:	Nm / lbf.ft.
Tension pulley, timing belt	30/22
Vibration damper, timing belt	24/18
Belt tensioner, mechanical	20/15
Idler pulley, timing belt	24/18
Water pump	17/13
Exhaust manifold	25/19
Studs (at exhaust port, manifold, turbocharger (TC))	20/15
Intake manifold	20/15
Fuel rail:	
Stage 1	10/7.4
Step 2 angle-tighten	75°
Sump	17/13
Oil pump	6/4.5
Plug, sump	38/28
Plug, gauge hole / crankshaft seal	38/28
Plug, gauge hole for gauging valve clearance	20/15
Oil intake line	17/13
Drain hose, turbocharger (TC)	12/9
Pipe screw, crankcase ventilation	26/19
Pipe screw, oil pressure pipes, turbocharger (TC)	26/19
Pipe screw, coolant pipes, turbocharger (TC)	26/19
Pipe screw, oil pressure pipes, cylinder block	38/28
Cover, front edge	17/13
Oil trap	15/11
Nipple, oil filter	40/30
Oil filter, environmental filter	25/19
Oil pressure switch	50/37
Dip stick	10/7.5
Engine speed (RPM) sensor	10/7.4
Knock sensor (KS)	20/15
Temperature sensor, engine coolant	22/16
Piston cooling valve, oil duct	35/26
Spark plugs	30/22
Flywheel:	
Stage 1	45/33
Step 2 angle-tighten	65°

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Group 21 Cylinder block

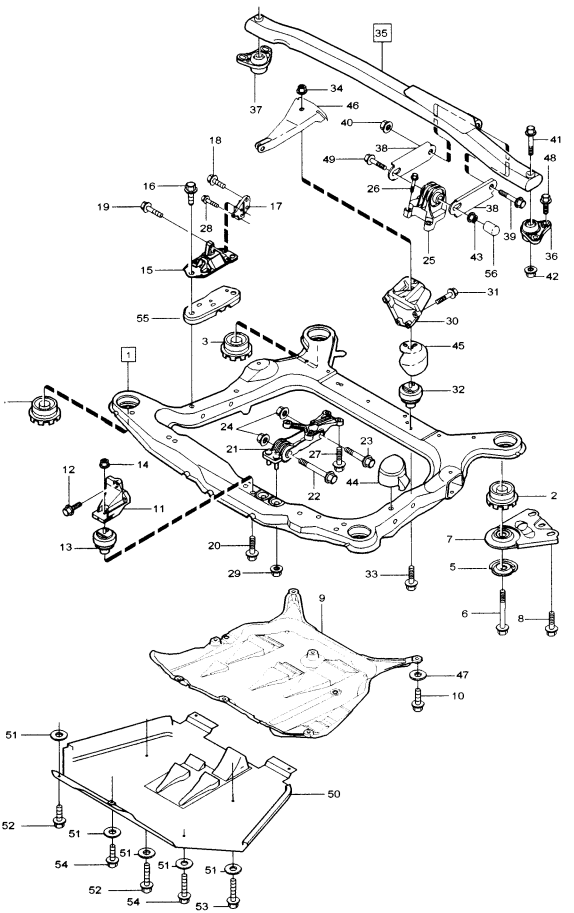
Tightening torques for lubricated screws and nuts:	Nm / lbf.ft.
Gearbox screw (lower torque rod):	
Stage 1	35/26
Step 2 ..... angle-tighten	40°

Tightening torques for D5244 T/T2, cylinder block

Tightening torques for lubricated screws and nuts:		Nm / lbf.ft.
Cylinder head (tighten the screws in sequence from the centre outwards):		
Stage 1		50/37
Stage 2		90/44
Step 3	angle-tighten	90°
Engine mounting Right side		
Stage 1, M10		35/26
Step 2, M8	angle-tighten	60°
Connecting rod cap:		
Stage 1		30 ± 3/22 ± 2
Step 2	angle-tighten	90°
Crankshaft centre nut		300/221
Flanged screw, vibration damper (4 flanged screws)		
Stage 1		35/26
Step 2	angle-tighten	50°
Carrier plate:		
Stage 1		45/33
Step 2	angle-tighten	50°
Gearbox - engine		48/35
Torque converter		50/37
Timing cover, front		12/9
Timing cover, rear		8/6
Timing gear pulley, camshaft		30/22
Timing gear pulley, camshaft with VVT		10/7.4
Camshaft pulley with VVT, centre screw		120/89
Camshaft pulley with VVT, centre plug		35/26
Belt tensioner, mechanical		35/26
Idler pulley, timing belt		24/18
Water pump		17/13
Exhaust manifold, cylinder head side		30/22
Exhaust manifold - turbocharger (TC), studs		20/15
EGR cooler, cylinder head side		50/37
Intake manifold		20/15
Fuel rail:		
Stage 1		10/7.4
Step 2	angle-tighten	75°

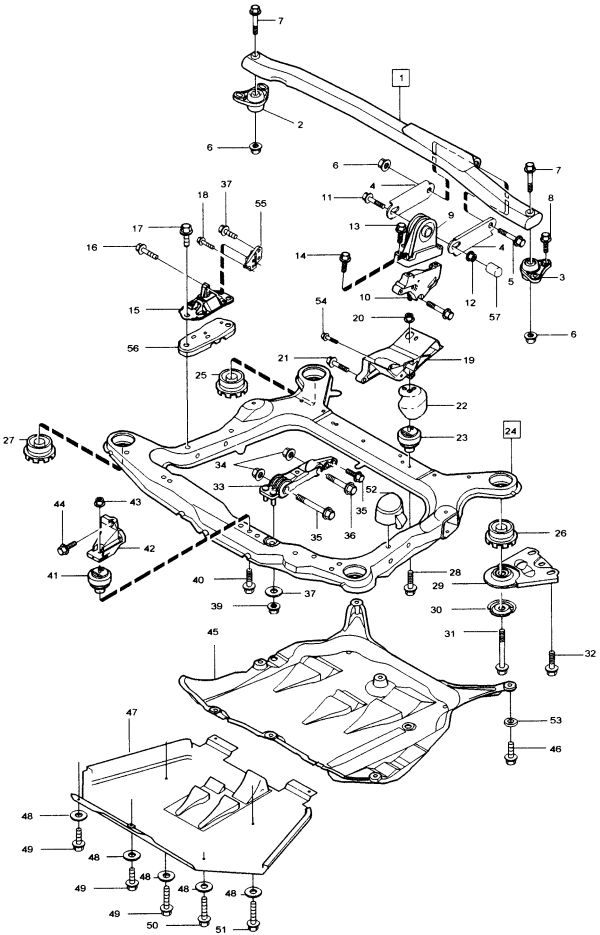
Tightening torques for lubricated screws and nuts:	Nm / lbf.ft.
Sump	17/13
Oil pump	6/4.5
Plug, sump	38/28
Oil intake line	17/13
Fuel injection pump	20/15
Drain hose, turbocharger (TC)	12/9
Pipe screw, crankcase ventilation	26/19
Pipe screw, oil pressure pipes, turbocharger (TC)	18/13
Pipe screw, coolant pipes, turbocharger (TC)	26/19
Pipe screw, oil pressure pipes, cylinder block	38/28
Oil trap	15/11
Oil filter, environmental filter	25/19
Oil pressure switch diesel	27/20
Dip stick	10/7.5
Engine speed (RPM) sensor	10/7.4
Knock sensor (KS)	20/15
Temperature sensor, engine coolant	22/16
Glow plug	10.5/7.5
Flywheel:	
Stage 1	45/33
Step 2 angle-tighten	65°

Engine mountings for 6 cylinder engines



Engine mountings for 6 cylinder petrol engines:		
Number (as illustrated):	Tightening torques for lubricated screws and nuts: Nm /lbf ft. And angle tightening if necessary.	Designation
1		Frame
6	105/78 Angle-tighten 120°	Sub-frame screw
8	M10 50/37	Flanged screw
10	M8 20/15	Flanged screw
11		Engine mounting
12	M10 50/37	Flanged screw
14	50/37	Flanged locknut
16	M12 35/26 angle-tighten 60°	Flanged screw
17		Engine mounting
18	M10 50/37 angle-tighten 60°	Flanged screw
28	M8 20/15 angle-tighten 60°	Flanged screw
19	M10 35/26 angle-tighten 60°	Flanged screw
20	M10 50/37	Flanged screw
22.24	M12 35/26 angle-tighten 90°	Flanged screw
23.24	M12 35/26 angle-tighten 40°	Flanged screw
26	M10 50/37	Flanged screw
27	M10 50/37	Flanged screw
29	M8 65/48 angle-tighten 60°	Flanged screw
31	M10 50/37	Flanged screw
32		Engine pad
33	M10 50/37	Flanged screw
34	50/37	Flanged locknut
35		Engine stabiliser brace
39.40	M12 80/59	Flanged screw
41	M12	Flanged screw
48	M10 50/37	Flanged screw
43.49	M12 80/59	Flanged screw
41.42	M12 80/59	Flanged screw
50		Backing plate
52.53	M8	Flanged screw
54	M8	Flanged screw
	Collision brace, rear engine mounting: Nut = 50/37 Screw = 50/37	

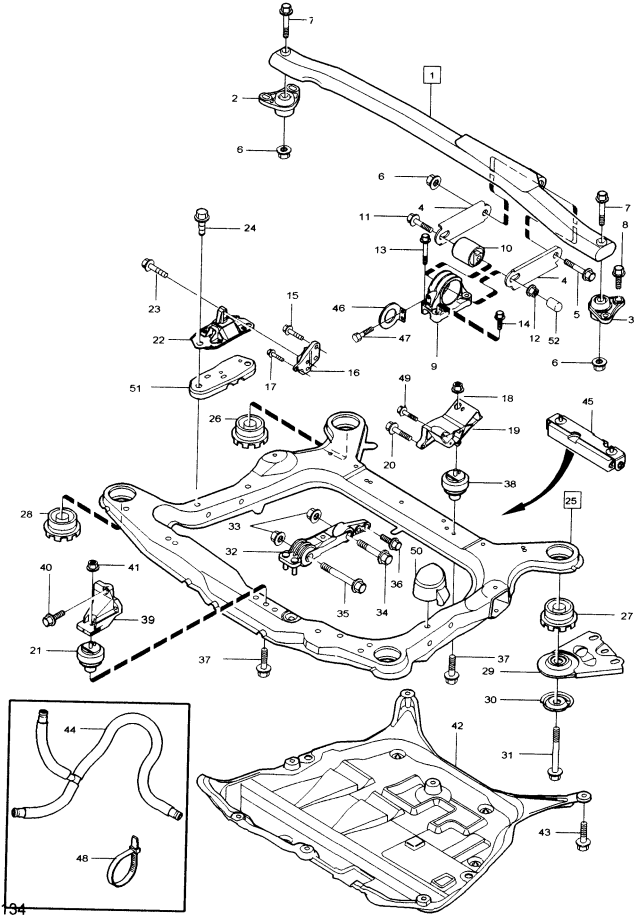
Engine mountings for petrol engines: B52XX



Engine mountings for 5-cylinder petrol engines		
Number (as illustrated):	Tightening torques for lubricated screws and nuts: Nm /lbf ft. And angle tightening if necessary: Degrees	Designation
1	Engine stabiliser brace	
5.6	M12 80/59	Flange screw, nut
6.7	M12 80/59	Flanged screw
8	50/37	
9		Engine mounting, upper
10	50/37	
11	M12 80/59	Flanged screw
13.14	M10 50/37	Flanged screw
16	M10 35/26 angle-tighten 90°	Flanged screw
17	M12 65/48 angle-tighten 60°	Flanged screw
18	M8 20/15 angle-tighten 60°	Flanged screw
19		Engine mounting, rear
20	50/37	Flanged locknut
21	M10 50/37	Flanged screw
23		Engine pad
24		Frame
28	M10 50/37	Flanged screw
29		Bracket
31	105/78 angle-tighten 120°	
32	M10 50/37	Flanged screw
33		Engine stabiliser brace
34.35	M10 35/26 angle-tighten 90°	Flanged screw
34.36	M10 35/26 angle-tighten 90°	Flanged screw
35	35/26 angle-tighten 40°	
37	M10 35/26 angle-tighten 60°	Flanged screw
38	M10	Flanged screw
39	65/48 angle-tighten 60°	
40	M10 50/37	Flanged screw
41		Engine pad
43	50/37	
44	M10 50/37	Flanged screw
46	M8 20/15	Flanged screw
47		Backing plate
49	M8	Flanged screw

Engine mountings for 5-cylinder petrol engines		
Number (as illustrated):	Tightening torques for lubricated screws and nuts: Nm /lbf ft. And angle tightening if necessary: Degrees	Designation
50	M8	Flanged screw
51	M8	Flanged screw
54	M10	Flanged screw
55		Engine mounting, right

Engine mountings for diesel engines:
D5244 T



Engine mountings for D5244 T		
Number (as illustrated):	Tightening torques for lubricated screws and nuts: Nm /lbf ft. And angle tightening if necessary: Degrees	Remarks
1		Engine stabiliser brace
5.6	M12 80/59	Flanged screw
6.7	M12 80/59	Flanged screw
8	M10 50/37	Flanged screw
11.12	M12 80/59	Flanged screw
13.14	M10 50/37	Flanged screw
15	M10 35/26 angle-tighten 60°	Flanged screw
16		Engine mounting, right
17	M8 20/15 angle-tighten 60°	Flanged screw
18	50/37	
19		Engine mounting
20	M10 50/37	Flanged screw
21		Engine pad, front
22		Engine pad, right
23	M10 35/26 angle-tighten 90°	Flanged screw
24	M12 65/48 angle-tighten 60°	Flanged screw
25		Frame
31	105/78 angle-tighten 120°	Sems screw
32	65/48 angle-tighten 60°	
33.34	M10 35/26 angle-tighten 90°	Flanged nut
33.35	M10 35/26 angle-tighten 90°	Flanged screw
36	M10 35/26 angle-tighten 40°	Flanged screw
37	M10 50/37	Flanged screw
38		Engine pad, rear
39		Engine mounting, front
40	M10 50/37	Flanged screw
41	50/37	
43	M8 20/15	Flanged screw
45		Vibration damper
46		Lifting eyelet
47	M7	Flanged screw
49	M10 50/37	Flanged screw

Group 22 Lubrication system

General

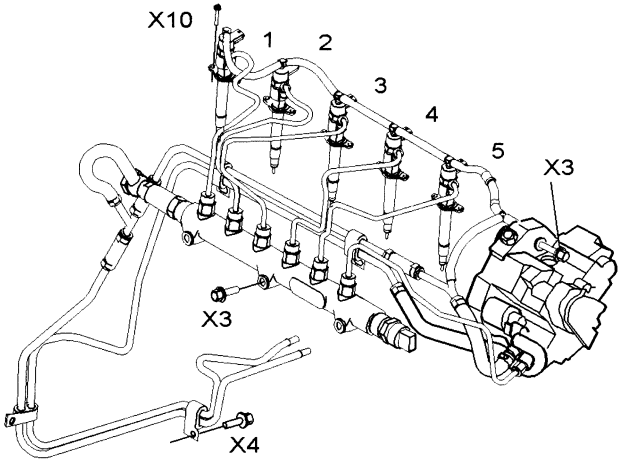
Oil volumes and grades, see: Section 1: Service and maintenance, Group 17: Service

Oil pressure: Engine at operating temperature, thermostat open and new oil filter. Engine speed rps (rpm)	Petrol engines:	D5252 T (S80,V70)	D5244 T
14 (810), minimum ..... MPa	0.1	0.015	
67.7 (4000), minimum ..... MPa	0.35	-	
33.3 (2000) ..... MPa	-	0.2	
The relief valve opens at a pressure of:			
5 cylinder ..... Mpa	0.48	0.53 - 0.63	0.55
6 cylinder (S80) ..... Mpa	0.65	–	–
Maximum oil pressure:			
5 cylinder ..... Mpa	0.7	0.7	0.7
6 cylinder (S80) ..... Mpa	0.9	–	–
Oil pressure sensor:			
Breakpoint, indicator lamp goes out at a pressure ..... MPa	0.04 - 0.06	0.015 - 0.035	0.06

Group 23 Fuel system

Fuel injection system, Diesel engine D 5244 T:

High-pressure pump:	
Type	Piston pump
Make	Bosch
Designation	CP3.3
Injectors:	Assembly:
EDC15C11 Class 1	Volvo P/N: 8658351
EDC15C11 Class 2	Volvo P/N: 8658352
EDC15C11 Class 3	Volvo P/N: 8658353
Turbocharger (TC) boost pressure, absolute pressure:	210 kPa



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Group 23 Fuel system

Tightening torques

D5244 T	Tightening torques Nm
Injectors: 1-5, two screws per injector. M6	10±1.5
X3, Rail secured with 3x M7 screws	16±3
X4, Fuel line secured with 4x M7 screws	14±3
X3, High-pressure pump 3x M7 screws	18±2
Fuel pressure pipe 12x nuts	28±3

Group 25 Intake and exhaust system

Tightening torques for the intake and exhaust system components

Petrol engines: Specific component:	Tightening torques Nm/lbf. ft.
Exhaust manifold, cylinder head side	25/19
Exhaust manifold - heat shield	15/11
Exhaust manifold - turbocharger (TC), nuts	25/19
Exhaust manifold - turbocharger (TC), studs	20/15
Exhaust system, pipe to turbocharger (TC)	30/22
Catalytic converter:	
towards the turbocharger (TC)	25/19
towards the exhaust system	24/17
Exhaust system, flange front - rear pipe	25/19
Exhaust system, pipe to exhaust manifold	25/19
Intake manifold, cylinder head side	20/15
Diesel engine D5244 T:	
Exhaust manifold, cylinder head side	30/22
Exhaust manifold - heat shield	15/11
Exhaust manifold - turbocharger (TC), nuts	30/22
Exhaust manifold - turbocharger (TC), studs	20/15
Exhaust system, pipe to turbocharger (TC) Use copper paste: Volvo P/N: 11 61 408-8	40/30
Intake manifold, cylinder head side	20/15
Three-way catalytic converter (TWC) stay - block	25/19
Diesel engine D5252 T (S80, V70):	
Exhaust manifold, cylinder head side	25/19
Exhaust manifold - heat shield	8/6
Exhaust manifold - turbocharger (TC), nuts/bi-hex screw	60/44
Exhaust manifold - turbocharger (TC), studs	40/30
Catalytic converter:	
towards the turbocharger (TC)	45/33
towards the exhaust system	25/19
Intake manifold, cylinder head side	22/16

Group 26 Cooling system

General

Never top up with water only.

Use Volvo Genuine parts **green coolant** (see table below) diluted 50/50 with **clean water.**

This mixture prevents corrosion and frost damage.

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 coolant has been exposed to oxidation and dirt.

Clean the cooling system when replacing coolant.

Use Volvo cleaning agent P/N 11 61 328.

Coolant, Volvo, green	Volvo P/N:
1 litres, cold market	13 81 076
5 litres, 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/55.5 gal, whole world	13 81 080
1 gal (3.785 litres), USA	13 81 081
5 litres/1.32 gal, ready-mixed: 50/50, Australia	13 81 082

Cooling system: Capacity, pressure and thermostat

Engine type:	Volume litres	Expansion tank pressure valve opens at		Thermostat °C (°F)		
		Over pressure kPa (psi)	Negative pressure kPa (psi)	Marking	Starts to open	Fully open
B5254 T2	8	150 (22 psi)	10 (1.4 psi)	90° (194°)	90° (194°)	105° (221°)
D 5244 T	9.0	150 (22 psi)	10 (1.4 psi)	90° (194°)	90° (194°)	105° (221°)
B6294	9.6	150	10 (1.4 psi)	90° (194°)	90° (194°)	105° (221°)

Group 28 Ignition system

General

Engine type	Ignition system
B6294 T	Bosch ME 7
B5254 T2	Bosch ME 7
D5244 T	EDC 15 C11

Group 28 Components

Technical data, ignition coil, spark plugs, sensors, engine cooling fan (FC), and tightening torques etc:

Components: Related to the ignition system		
Ignition coil, ignition discharge module	Volvo P/N	91 25 601
Spark plugs B5254 T	Volvo kit no.	86 92 071
Spark plugs B6294 T	Volvo kit no.	86 92 072
Electrode gap B5254 T2:	mm	0.7 (0.027")
Electrode gap B6294 T:	mm	0.7 (0.027")
Tightening torques	Nm (lbf ft.)	30 (22)
Knock sensor (KS)	Volvo P/N.	94 32 570
		Denso own system
Tightening torques	Nm (lbf ft.)	20 (15)
Speed sensor, flywheel –2003	Volvo P/N.	12 75 599
Speed sensor, flywheel 2003–	Volvo P/N.	86 27 355
Resistance in coil, at 20C°/68F° degrees	Ω	125 ± 25
Inductance in coil, at 20C°/68F° degrees	mH	85 ± 10 (1 kHz)
Camshaft position (CMP) sensor –2003	Volvo P/N	92 25 134
Camshaft position (CMP) sensor 2003–	Volvo P/N	86 27 354
Engine cooling fan (FC), control module 40 A	Volvo P/N.	92 09 814
Resistance in coil	Ω	80
Relay, A/C	Volvo P/N	91 62 300

Components Bosch ME-7:

Components related to the ignition and fuel system Type ME-7:	
Control module	Built-in atmospheric pressure sensor.
Throttle unit	Damper motor integrated with electronic module.
Accelerator pedal (AP) position sensor	Pulse width modulated and linear signal (digital / analogue).
Pressure regulator	Line pressure 380 kPa.
Mass air flow (MAF) sensor	Mass air flow (MAF) sensor resistive film. Measurement range 12 - 640 kg/h.
Fuel pump	Pump capacity: At line pressure of 380 kPa and 13 V is > 125 l/min. Power consumption at line pressure: 7.5 A.
Injector	Resistance, coil: 12 Ω.
T-MAPS: Boost pressure, Intake air temperature sensor	Piezo resistive linear pressure sensor. Measurement range 20 - 250 kPa. NTC resistor.
Turbocharger (TC) control valve	PWM controlled valve. Resistance 29.7 Ω.
Camshaft reset valve VVT	PWM controlled valve. Resistance 3.7 Ω.
Knock sensor (KS)	Piezo-electric crystal.
Camshaft position (CMP) sensor	Magneto-resistive sensor with a permanent magnet.
Engine speed (RPM) sensor. Applies at 20°C/68°F	Inductive sensor with permanent magnet. Resistance 125.5± 25 Ω.
Heated oxygen sensor (HO2S), front Preheating	Linear sensor. Resistance 3 Ω, at 20°C/68°F.
Heated oxygen sensor (HO2S), rear Preheating	Binary sensor. Resistance 9 Ω, at 20°C/68°F.
Ignition coil	Individually mounted ignition coil. Integrated ignition discharge module (IDM) and diagnostics.
Spark plug type	Multi-electrode.
Outside temperature sensor	NTC resistor.
Air conditioning (A/C) pressure switch (Pressostat)	Pressure switch.
A/C pressure sensor	Linear pressure sensor. Measurement range 0 -3100 kPa.
Canister purge (CP) valve	Pulse width modulated. Resistance 29.7± 1.4Ω.

Components related to the ignition and fuel system Type ME-7:	
Fuel tank pressure sensor	Piezo electric linear pressure sensor.
Fuel pump (FP) relay	Frequency controlled mechanical relay.
Air conditioning (A/C) relay	Mechanical relay. Resistance in coil 96 Ω.
Engine cooling fan (FC) control module	PWM controlled discharge module with variable output voltage and diagnostics.
System relay	Mechanical relay. Resistance 80 Ω.
Clutch pedal position sensor	Self-adjusting.
Brake pedal position sensor	Self-adjusting.
Brake lamp switch	Two. One switch and one sensor.
Engine coolant level switch	Level indicator.
Oil pressure switch	Pressure switch.

Technical data

Applies to ME-7 ignition and fuel system:

Mass air flow (MAF) sensor:				
Q kg/h	12	15	30	60
Voltage V	1.3	1.4	1.7	2.1
Boost pressure sensor:				
P kPa	90	101	150	200
Voltage V	1.7	1.9	2.8	3.7
Engine coolant temperature (ECT) sensor:				
Temperature °C (F°)	10° (50°)	20° (68°)	80° (176°)	100° (212°)
Resistance Ω	3700	2450	318	184
Temperature sensor, intake air:				
Temperature °C (F°)	0° (32°)	20° (68°)	30° (86°)	40° (104°)
Resistance Ω	5886±5%	2510±5%	1715±5%	1199±5%
Outside temperature sensor:				
Temperature °C (F°)	0° (32°)	20° (68°)	25° (77°)	30° (86°)
Resistance Ω	6318	2424	1941	1513
Voltage V	4.3	3.5	3.3	3
Air conditioning (A/C) pressure switch (Pressostat):				
Pressure kPa	195 - 325		160 - 180	
Status To/From	On		Off	

Technical data Applies to ME-7 ignition and fuel system:				
Clutch pedal position sensor:				
Position ..... mm	0	25 (0.98")	50 (1.97")	100 (3.93")
Resistance ..... Ω	1500 - 2500	1000 - 2000	750 - 1750	500 - 1000
Brake pedal position sensor:				
Position ..... mm	0	20 (0.79")	30 (1.18")	50 (1.97")
Resistance ..... Ω	1300 - 2100	1000 - 1800	900 - 1700	600 - 1400