



Contents

00 - Technical data	1
1 Technical data	1
1.1 Engine number	1
1.2 Engine data	1
10 - Removing and installing engine	2
1 Removing and installing engine	2
1.1 Removing engine	3
1.2 Installing engine	8
13 - Crankshaft group	11
1 Dismantling and assembling engine	11
1.1 Assembly overview	11
1.2 Removing and installing poly V-belt	17
2 Sealing flanges and flywheel	19
2.1 Assembly overview - sealing flange	19
2.2 Renewing crankshaft oil seal - pulley end	20
2.3 Removing and installing sealing flange - pulley end	22
2.4 Removing and installing crankshaft sealing flange - flywheel end	25
3 Removing and installing crankshaft	30
3.1 Assembly overview - crankshaft	30
3.2 Crankshaft dimensions	32
4 Dismantling and assembling pistons and conrods	33
4.1 Assembly overview - pistons and conrods	33
4.2 Separating new conrod	34
4.3 Checking pistons, piston rings and cylinder bores	34
4.4 Piston and cylinder dimensions	36
15 - Cylinder head, valve gear	37
1 Cylinder head	37
1.1 Assembly overview - cylinder head	37
1.2 Removing and installing cylinder head	40
1.3 Removing, installing and tensioning toothed belt	44
1.4 Checking semi-automatic toothed belt tensioning roller	50
1.5 Checking compression	51
2 Valve gear	53
2.1 Assembly overview - valve gear	53
2.2 Valve dimensions	55
2.3 Reworking valve seats	55
2.4 Checking valve guides	57
2.5 Renewing camshaft oil seal	57
2.6 Removing and installing camshaft	60
2.7 Renewing valve stem seals	64
17 - Lubrication	67
1 Parts of lubrication system	67
1.1 Engine oil	67
1.2 Assembly overview - parts of lubrication system	67
1.3 Removing and installing sump	70
1.4 Removing and installing oil pump	71
1.5 Checking oil pressure and oil pressure switch	72
19 - Cooling	74



1	Removing and installing parts of cooling system	74
1.1	Assembly overview - parts of cooling system, engine side	74
1.2	Assembly overview - parts of cooling system, body side (radiator with two radiator fans)	76
1.3	Assembly overview - parts of cooling system, body side (radiator with one radiator fan)	77
1.4	Coolant hose schematic diagram	78
1.5	Draining and filling coolant	79
1.6	Removing and installing radiator	82
1.7	Removing and installing coolant pump	85
1.8	Removing and installing thermostat	87
1.9	Removing and installing radiator fan V7 and radiator fan 2 V177	89
1.10	Checking cooling system for leaks	90
20 - Fuel supply system		93
1	Fuel tank	93
1.1	Safety precautions when working on fuel supply system	93
1.2	Rules for cleanliness	93
1.3	Assembly overview - fuel tank	94
1.4	Emptying fuel tank	95
1.5	Removing and installing fuel tank	99
2	Repairing fuel supply system	103
2.1	Safety precautions when working on fuel supply system	103
2.2	Rules for cleanliness	104
2.3	Removing and installing fuel delivery unit	104
2.4	Removing and installing fuel gauge sender G	107
2.5	Checking fuel pump	108
2.6	Bleeding fuel system	116
3	Electronic power control (EPC)	120
3.1	Function of EPC system	120
3.2	Assembly overview - accelerator module	120
3.3	Removing and installing accelerator module	121
4	Activated charcoal filter system	124
4.1	Function	124
4.2	Assembly overview - activated charcoal filter system	124
4.3	Checking fuel tank breather	125
24 - Mixture preparation - injection		127
1	Repairing injection system	127
1.1	General notes on injection	127
1.2	Safety precautions	128
1.3	Rules for cleanliness	128
1.4	Technical data	129
1.5	Assembly overview - intake manifold with attachments	129
1.6	Assembly overview - fuel rail with injectors	131
1.7	Assembly overview - air filter with attachments	132
1.8	Removing and installing lower part of intake manifold	132
1.9	Removing and installing complete intake manifold	134
1.10	Removing and installing injectors	137
2	Checking components	139
2.1	Checking injectors for leaks and quantity injected	139
2.2	Checking intake manifold change-over	143
3	Engine control unit	145
3.1	Removing and installing engine control unit	145
3.2	Removing and installing anti-theft engine control unit	146



26 - Exhaust system	150
1 Removing and installing parts of exhaust system	150
1.1 Assembly overview - exhaust system	150
1.2 Separating centre and rear silencers	152
1.3 Removing and installing front exhaust pipe with catalytic converter	153
1.4 Removing and installing exhaust manifold	155
2 Secondary air system	156
2.1 Function	156
2.2 Assembly overview - secondary air system, engine code BSE	156
2.3 Checking combination valve	157
28 - Ignition system	159
1 Repairing ignition system	159
1.1 General notes on ignition system	159
1.2 Safety precautions	159
1.3 Assembly overview - ignition system	159
1.4 Test data, spark plugs	160