



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	3
1.2 Installing	5
1.3 Specified torques	7
1.4 Additional information and assembly work for vehicles with air conditioner	8
13 - Crankshaft group	10
1 Dismantling and assembling engine	10
1.1 Assembly overview - parts I and II	10
1.2 Assembly overview - part I, belt drive	12
1.3 Part II: assembly overview - chain drive system	13
1.4 Removing and installing poly V-belt	15
1.5 Removing and installing valve timing housing (timing case)	16
2 Cylinder block, sealing flange	20
2.1 Assembly overview	20
2.2 Renewing crankshaft oil seal - pulley end	22
2.3 Poly V-belt pulley securing bolt tightening procedure	23
2.4 Renewing crankshaft sealing flange - flywheel end	26
2.5 Crankshaft dimensions	33
3 Pistons and conrods	35
3.1 Assembly overview	35
3.2 Checking piston	36
3.3 Checking cylinder bores	37
3.4 Piston and cylinder dimensions	37
15 - Cylinder head, valve gear	38
1 Cylinder head	38
1.1 Assembly overview	38
1.2 Checking valve timing	41
1.3 Adjusting valve timing	42
1.4 Removing and installing timing chain and chain drive for oil pump	46
1.5 Removing and installing camshaft housing	53
1.6 Removing and installing cylinder head	57
1.7 Checking compression	60
2 Valve gear	62
2.1 Assembly overview	62
2.2 Checking camshaft axial clearance	64
2.3 Reworking valve seats	64
2.4 Checking valve guides	66
2.5 Renewing valve stem seals	66
17 - Lubrication	69
1 Parts of lubrication system	69
1.1 Engine oil	69
1.2 Assembly overview	69
1.3 Removing and installing sump	72
1.4 Removing and installing oil pump	73



1.5	Checking oil pressure and oil pressure switch	75
19	- Cooling	78
1	Parts of cooling system	78
1.1	Assembly overview - parts of cooling system, body side	78
1.2	Assembly overview - parts of cooling system, engine side	80
1.3	Coolant hose schematic diagram	82
1.4	Draining and filling coolant	83
1.5	Removing and installing radiator	85
1.6	Removing and installing coolant pump	86
20	- Fuel supply system	89
1	Safety precautions	89
1.1	Safety precautions when working on fuel supply system	89
1.2	Releasing pressure in high-pressure area	90
2	Parts of fuel supply system	91
2.1	Assembly overview - fuel tank with attachments	91
2.2	Safety precautions when working on fuel supply system	94
2.3	Rules for cleanliness	94
2.4	Removing and installing fuel delivery unit	94
2.5	Removing and installing fuel gauge sender G	96
2.6	Removing and installing fuel tank	97
2.7	Crash fuel shut-off	99
2.8	Checking fuel pump	99
3	Electronic power control (EPC)	106
3.1	Function of EPC system	106
3.2	Assembly overview	106
4	Activated charcoal filter system	108
4.1	Function	108
4.2	Assembly overview	108
4.3	Checking fuel tank breather	109
24	- Mixture preparation - injection	111
1	Injection system	111
1.1	General notes on injection	111
1.2	Assembly overview - intake manifold	111
1.3	Assembly overview - fuel rail with injectors	114
1.4	Checking vacuum reservoir in intake manifold for leaks	115
1.5	Assembly overview - air filter	116
1.6	Removing and installing air filter	117
1.7	Cleaning throttle valve module J338	117
1.8	Removing and installing injectors	118
1.9	Removing and installing high-pressure pump	121
1.10	Safety precautions	123
1.11	Rules for cleanliness	124
1.12	Technical data	124
2	Checking components	126
2.1	Checking intake air preheating	126
3	Engine control unit J623	127
3.1	Removing and installing engine control unit J623	127
3.2	Removing and installing anti-theft engine control unit J623 (vehicles ► model year 2007)	127
3.3	Removing and installing anti-theft engine control unit J623 (vehicles model year 2007 ►)	129
26	- Exhaust system	131



1	Parts of the exhaust system	131
1.1	Assembly overview - catalytic converters and attachments	131
1.2	Assembly overview - silencers with mountings	133
2	Exhaust gas recirculation system	134
2.1	Assembly overview - exhaust gas recirculation system	134
2.2	Removing and installing exhaust gas recirculation valve N18	135
28	- Ignition system	137
1	Ignition system	137
1.1	Assembly overview - ignition system	137
1.2	Removing and installing ignition coils with output stage	138
1.3	Safety precautions	139
1.4	Test data, spark plugs	140