



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 Securing engine to assembly stand	9
1.3 Installing engine	9
1.4 Torque settings	11
1.5 Assembly mountings	12
1.6 Additional notes and assembly work for vehicles with air conditioner	13
13 - Crankshaft group	14
1 Dismantling and assembling engine	14
1.1 Parts I and II - assembly overview	15
1.2 Part I Assembly overview - belt drive	16
1.3 Part II Assembly overview - cylinder block	17
1.4 Removing and installing poly V-belt	19
1.5 Removing and installing valve timing housing	22
2 Removing and installing sealing flanges and flywheel or drive plate	25
2.1 Assembly overview	25
2.2 Renewing crankshaft oil seal - belt pulley end	27
2.3 Removing and installing crankshaft pulley	29
2.4 Renewing crankshaft sealing flange - flywheel end	31
3 Crankshaft	39
3.1 Assembly overview - crankshaft	39
3.2 Crankshaft dimensions	40
4 Dismantling and assembling pistons and conrods	41
4.1 Assembly overview	41
4.2 Checking piston	42
4.3 Piston and cylinder dimensions	43
15 - Cylinder head, valve gear	44
1 Cylinder head	44
1.1 Assembly overview	45
1.2 Checking valve timing	47
1.3 Adjusting valve timing	49
1.4 Removing and installing camshaft housing	55
1.5 Removing and installing cylinder head	58
1.6 Checking compression	61
2 Valve gear	63
2.1 Assembly overview	63
2.2 Checking camshaft axial clearance	64
2.3 Reworking valve seats	65
2.4 Checking valve guides	66
2.5 Renewing valve stem seals	67
17 - Lubrication	69
1 Parts of lubrication system	69
1.1 Engine oil	69



1.2	Assembly overview	70
1.3	Removing and installing sump	72
1.4	Removing and installing oil pump	73
1.5	Checking oil pressure and oil pressure switch	76
19 - Cooling		78
1	Parts of cooling system	78
1.1	Assembly overview - parts of cooling system, body side	79
1.2	Assembly overview - parts of cooling system, engine side	80
1.3	Coolant hose schematic diagram	81
1.4	Draining and filling coolant	82
1.5	Removing and installing radiator fan V7 and radiator fan 2 V177	84
1.6	Removing and installing radiator	86
1.7	Removing and installing coolant pump	87
1.8	Removing and installing coolant circulation pump V50	91
20 - Fuel supply system		93
1	Safety precautions	93
1.1	Safety precautions when working on fuel supply system	93
1.2	Releasing pressure in high-pressure section	93
2	Fuel tank	95
2.1	Safety precautions when working on fuel supply system	95
2.2	Releasing pressure in high-pressure section	95
2.3	Rules for cleanliness	96
2.4	Assembly overview - fuel tank	97
2.5	Emptying fuel tank	98
2.6	Removing and installing fuel tank	101
3	Removing and installing parts of fuel supply system	103
3.1	Safety precautions when working on fuel supply system	103
3.2	Releasing pressure in high-pressure section	104
3.3	Rules for cleanliness	104
3.4	Removing and installing fuel delivery unit	105
3.5	Removing and installing fuel gauge sender G	107
3.6	Crash fuel shut-off	107
3.7	Checking fuel pump	108
3.8	Assembly overview - high-pressure pump	114
3.9	Removing and installing high-pressure pump	114
4	Repairing electronic power control (EPC)	119
4.1	Function of EPC system	119
4.2	Assembly overview	120
4.3	Removing and installing accelerator pedal module	120
5	Activated charcoal filter system	122
5.1	Function	122
5.2	Checking fuel tank breather	122
21 - Turbocharging/supercharging		124
1	Turbocharger	124
1.1	Assembly overview - turbocharger	124
1.2	Part I	125
1.3	Part II	126
1.4	Removing and installing turbocharger	126
1.5	Checking turbocharger vacuum unit	130
2	Compressor	133
2.1	Assembly overview - compressor	133
2.2	Removing and installing compressor	134



3	Charge air system	141
3.1	Assembly overview - charge air system	141
3.2	Checking charge air system for leaks	141
24 - Mixture preparation - injection		145
1	Repairing injection system	145
1.1	Parts I and II - assembly overview - intake manifold	145
1.2	Part I - assembly overview - intake manifold	147
1.3	Part II - assembly overview - intake manifold	149
1.4	Assembly overview - fuel rail with injectors	151
1.5	Checking vacuum reservoir for leaks	152
1.6	Assembly overview - air filter	153
1.7	Removing and installing air filter	153
1.8	Removing and installing regulating flap control unit J808 and throttle valve module J338	154
1.9	Cleaning throttle valve module J338	157
1.10	Removing and installing injectors	158
1.11	Safety precautions	161
1.12	Rules for cleanliness	163
1.13	Technical data	163
2	Engine control unit	164
2.1	Removing and installing engine control unit	164
2.2	Removing and installing anti-theft engine control unit	165
26 - Exhaust system		168
1	Parts of exhaust system	168
1.1	Assembly overview - catalytic converter and attachments	168
1.2	Assembly overview - silencers with mountings	170
1.3	Separating centre and rear silencers	170
28 - Ignition system		173
1	Repairing ignition system	173
1.1	Assembly overview - ignition system	173
1.2	Removing and installing ignition coils with output stage	174
1.3	Safety precautions	175
1.4	Spark plug test data	176