

Contents

00 - Technical data	1
1 Technical data	1
1.1 Engine number	1
1.2 Engine data	1
2 General repair instructions	2
2.1 Rules for cleanliness when working on the injection system	2
2.2 Checking for leaks in the fuel system	2
10 - Removing and installing engine	3
1 Removing and installing engine	3
1.1 Removing engine	4
1.2 Securing engine to assembly stand	17
1.3 Installing engine	18
13 - Crankshaft group	22
1 Servicing work on pulley end	22
1.1 Poly V-belt drive for power steering pump, alternator and viscous fan - exploded view of components	22
1.2 Poly V-belt drive for air conditioner - exploded view of components	24
1.3 Removing and installing poly V-belt	24
1.4 Removing and installing pulley	27
1.5 Removing and installing bracket for ancillaries	28
1.6 Toothed belt drive - exploded view of components	32
1.7 Removing and installing toothed belt	34
1.8 Removing toothed belt from camshaft sprocket	40
1.9 Checking semi-automatic tensioning roller for toothed belt	44
2 Removing and installing sealing flanges and dual-mass flywheel	46
2.1 Renewing crankshaft oil seal (pulley end)	47
2.2 Removing and installing sealing flange (front)	50
2.3 Removing and installing dual-mass flywheel	54
2.4 Removing and installing sealing flange (rear)	56
3 Removing and installing crankshaft	59
3.1 Crankshaft - exploded view of components	59
3.2 Crankshaft dimensions	61
3.3 Measuring radial clearance of crankshaft	61
3.4 Extracting and driving in needle bearing for crankshaft	62
3.5 Removing and installing drive chain sprocket for oil pump	63
4 Dismantling and assembling pistons and conrods	65
4.1 Pistons and conrods - exploded view of components	65
4.2 Piston and cylinder dimensions	68
4.3 Checking radial clearance of conrod bearings	68
15 - Cylinder head, valve gear	69
1 Removing and installing cylinder head	69
1.1 Cylinder head - exploded view of components	69
1.2 Removing and installing cylinder head cover	71
1.3 Removing and installing cylinder head	71
2 Removing and installing intake manifold	82
2.1 Intake manifold - exploded view	82
2.2 Removing and installing intake manifold (top section)	83
2.3 Removing and installing intake manifold (bottom section)	86
2.4 Checking compression	87



3	Servicing valve gear	90
3.1	Valve gear - exploded view of components	90
3.2	Checking axial clearance of camshaft	91
3.3	Renewing camshaft oil seal	92
3.4	Removing and installing camshaft	94
3.5	Checking supporting elements with hydraulic clearance compensation	98
3.6	Renewing valve stem oil seals	99
3.7	Valve dimensions	103
3.8	Checking valve guides	103
3.9	Machining valve seats	104
3.10	Checking valves	106
17	- Lubrication	107
1	Removing and installing parts of lubrication system	107
1.1	Sump and oil pump - exploded view of components	107
1.2	Removing and installing sump	109
1.3	Removing and installing oil pump	117
1.4	Oil filter and oil cooler - exploded view of components	117
1.5	Removing and installing oil filter bracket	119
1.6	Checking oil pressure and oil pressure switch F1	120
1.7	Engine oil	123
1.8	Checking oil level	124
19	- Cooling	125
1	Removing and installing parts of cooling system	125
1.1	Diagram of coolant hose connections	125
1.2	Draining and filling cooling system	127
1.3	Removing and installing coolant pump	133
1.4	Removing and installing coolant pipe (top)	135
1.5	Removing and installing coolant pipe (bottom)	136
1.6	Removing and installing thermostat	137
1.7	Checking thermostat	139
1.8	Radiator and radiator fan - exploded view of components	139
1.9	Removing and installing radiator	140
1.10	Removing and installing viscous fan	143
1.11	Removing and installing viscous fan bearing	143
1.12	Checking cooling system for leaks	146
26	- Exhaust system	149
1	Removing and installing parts of exhaust system	149
1.1	Exhaust system - exploded view of components	149
1.2	Separating centre and rear silencers	151
1.3	Removing and installing front exhaust pipe	153
1.4	Removing and installing front exhaust pipe with catalytic converter	154
1.5	Removing and installing exhaust manifold	157
1.6	Stress-free alignment of exhaust system	160
1.7	Tailpipe alignment	161
1.8	Checking exhaust system for leaks	161
2	Exhaust gas recirculation system	162
2.1	Exhaust gas recirculation system - exploded view of components	162
2.2	Checking adaption of zero position for exhaust gas recirculation valve N18	164
2.3	Performing electrical check of exhaust gas recirculation valve N18 with exhaust gas recirculation potentiometer G212	165
2.4	Removing and installing exhaust gas recirculation valve N18 with exhaust gas recirculation potentiometer G212	171
3	Secondary air system	172

3.1	Principle and function	172
3.2	Checking secondary air inlet valve N112	173
3.3	Checking secondary air pump relay J299 and activation	177
3.4	Checking combination valve for secondary air system for proper operation and leakage ..	182
3.5	Removing and installing combination valve for secondary air system	183
3.6	Removing and installing secondary air pump	184