

Contents

00 - Technical data	1
1 Technical data	1
1.1 Technical data	1
1.2 Engine number	1
1.3 Engine data	1
10 - Removing and installing engine	3
1 Removing and installing engine	3
1.1 Removing and installing engine	3
1.2 Removing	4
1.3 Attaching engine to engine stand	19
1.4 Installing	19
1.5 Tightening torques	21
13 - Crankshaft group	24
1 Dismantling and assembling engine	24
1.1 Dismantling and assembling engine	24
1.2 Lock carrier: move into service position	24
1.3 Ribbed belt drive for vane pump, alternator, coolant pump and viscous fan	29
1.4 Removing and installing viscous fan	35
1.5 Ribbed belt drive for air conditioner	36
1.6 Routing of ribbed belt	39
1.7 Removing and installing ribbed belt	40
1.8 Removing and installing bearing for viscous fan	43
1.9 Removing and installing bracket for alternator, vane pump and viscous fan	44
1.10 Toothed belt drive	47
1.11 Removing and installing toothed belt, engine codes 1Z, AFF, AFN, AHU	55
1.12 Removing and installing toothed belt, engine code AHH	61
1.13 Checking semi automatic toothed belt tensioner	67
1.14 Rotating crankshaft to TDC with engine removed	68
2 Removing and installing sealing flanges and flywheel/drive plate	70
2.1 Removing and installing sealing flanges and flywheel/drive plate	70
2.2 Renewing crankshaft oil seal on pulley end	76
2.3 Removing and installing dual mass flywheel/drive plate	79
3 Removing and installing crankshaft	82
3.1 Removing and installing crankshaft	82
3.2 Removing and installing needle bearing in crankshaft	87
3.3 Crankshaft dimensions	88
4 Dismantling and assembling pistons and conrods	89
4.1 Dismantling and assembling pistons and conrods	89
4.2 Checking piston projection at TDC	97
4.3 Piston and cylinder dimensions	99
15 - Cylinder head, Valve gear	100
1 Removing and installing cylinder head	100
1.1 Removing and installing cylinder head	100
1.2 Removing and installing cylinder head cover	105
1.3 Removing and installing intake pipe, engine codes 1Z, AFF, AHU	107
1.4 Removing and installing intake pipe, engine codes AFN, AHH	108
1.5 Removing cylinder head	109
1.6 Installing cylinder head	117
1.7 Check compression	120
2 Servicing valve gear	122



2.1	Servicing valve gear	122
2.2	Checking camshaft axial clearance	129
2.3	Removing and installing camshaft	130
2.4	Checking hydraulic bucket tappets	134
2.5	Renewing valve stem seals	136
2.6	Reworking valve seats	138
2.7	Checking valve guides	140
17	- Lubrication	141
1	Removing and installing parts of the lubrication system	141
1.1	Removing and installing parts of the lubrication system	141
1.2	Part I	142
1.3	Part II	147
1.4	Removing and installing oil pan	151
1.5	Removing and installing oil pump	158
1.6	Checking oil pressure and oil pressure switch	158
1.7	Engine oil	161
1.8	check oil level	161
19	- Cooling system	162
1	Removing and installing parts of the cooling system	162
1.1	Removing and installing parts of the cooling system	162
1.2	Parts of cooling system	163
1.3	Draining and filling cooling system	165
1.4	Removing and installing coolant pump and coolant thermostat	170
1.5	Removing and installing coolant pump	172
1.6	Removing and installing, checking coolant thermostat	173
1.7	Removing and installing coolant pipe	173
1.8	Removing and installing radiator	176
1.9	Checking cooling system for leaks	179
21	- Charging	182
1	Charge air system with turbocharger	182
1.1	Charge air system with turbocharger	182
1.2	Diagram of connections for boost pressure control - engine codes 1Z, AFF, AHU	182
1.3	Diagram for boost pressure control - engine codes AFN, AHH	184
1.4	Checking turbocharger and boost pressure control system	187
1.5	Testing boost pressure - engine codes 1Z, AFF, AHU	188
1.6	Testing boost pressure - engine code AFN, AHH	192
1.7	Checking linkage and pressure unit for boost pressure regulating valve - engine codes 1Z, AFF, AHU	194
1.8	Checking linkage and vacuum unit for boost pressure control - engine codes AFN, AHH	195
1.9	Checking solenoid valve for boost pressure limitation -N75	197
1.10	Check intake manifold pressure sensor	202
1.11	Rules for cleanliness	203
1.12	Turbocharger- engine codes 1Z, AFF, AHU	204
1.13	Removing and installing pressure unit for boost pressure regulating valve - engine codes 1Z, AFF, AHU	208
1.14	Removing and installing turbocharger, engine codes 1Z, AFF, AHU	209
1.15	Turbocharger-engine codes AFN, AHH	212
1.16	Removing and installing turbocharger - engine codes AFN, AHH	217
1.17	Removing and installing parts of charge air cooling system > 06.97	221
1.18	Removing and installing parts of charge air cooling system 07.97 ä	224
1.19	Removing and installing charge air cooler (intercooler)	225
26	- Exhaust system	227
1	Removing and installing parts of exhaust system	227
1.1	Removing and installing parts of exhaust system	227

1.2	Vehicles with front-wheel drive . . . . .	.227
1.3	Vehicles with four-wheel drive . . . . .	.233
1.4	Separating front and rear silencers . . . . .	.238
1.5	Removing and installing exhaust manifold . . . . .	.240
1.6	Removing and installing exhaust pipe . . . . .	.240
1.7	Removing and installing catalytic converter . . . . .	.242
1.8	Stress free alignment of exhaust system . . . . .	.243
1.9	Checking exhaust system for leaks . . . . .	.246
2	Exhaust gas recirculation system . . . . .	.246
2.1	Exhaust gas recirculation system . . . . .	.246
2.2	Removing and installing parts of exhaust gas recirculation . . . . .	.247
2.3	Diagram of vacuum hose connections . . . . .	.249
2.4	Checking mechanical EGR valve . . . . .	.251
2.5	Testing exhaust gas recirculation > 06.97 . . . . .	.251
2.6	Test exhaust gas recirculation 07.97 ä . . . . .	.254
2.7	Checking EGR valve -N18 . . . . .	.256