



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	2
1 Removing and installing engine	2
1.1 Removing and installing engine	2
1.2 Notes on removing	2
1.3 Notes on installing	4
1.4 Tightening torques	5
1.5 Assembly mountings	6
1.6 Aligning engine and gearbox	8
1.7 Renewing engine carrier rubber mounting	10
1.8 Additional information and removal instructions for vehicles with air conditioner	11
13 - Crankshaft group	12
1 Dismantling and assembling engine	12
1.1 Dismantling and assembling engine	12
1.2 Removing and installing ribbed belt	26
1.3 Removing and installing toothed belt	29
1.4 Checking semi-automatic toothed belt tensioning roller	34
1.5 Removing single part injection pump sprocket	34
2 Removing and installing sealing flanges and flywheel/drive plate	36
2.1 Removing and installing sealing flanges and flywheel/drive plate	36
2.2 Renewing crankshaft oil seal - pulley end -	39
2.3 Removing and installing drive plate	40
3 Removing and installing crankshaft	43
3.1 Removing and installing crankshaft	43
3.2 Crankshaft dimensions	46
4 Dismantling and assembling pistons and conrods	47
4.1 Dismantling and assembling pistons and conrods	47
4.2 Checking piston projection at TDC	54
4.3 Piston and cylinder dimensions	55
15 - Cylinder head, Valve gear	56
1 Removing and installing cylinder head	56
1.1 Removing and installing cylinder head	56
1.2 Installing cylinder head	63
1.3 Checking compressions	64
2 Servicing valve gear	67
2.1 Servicing valve gear	67
2.2 Reworking valve seats	73
2.3 Checking valve guides	75
2.4 Renewing valve guides	76
2.5 Renewing valve stem seals	76
2.6 Removing and installing camshaft	78
2.7 Checking hydraulic bucket tappets	79
2.8 Replacing swirl chambers	80
17 - Lubrication	82
1 Removing and installing parts of the lubrication system	82



1.1	Removing and installing parts of the lubrication system	82
1.2	Checking oil pressure and oil pressure switch	89
1.3	Removing and installing oil sump cap	89
19	- Cooling system	91
1	Removing and installing parts of cooling system	91
1.1	Removing and installing parts of cooling system	91
1.2	Parts of cooling system body side	92
1.3	Parts of cooling system - engine side	96
1.4	Dismantling and assembling coolant pump	99
1.5	Draining and filling cooling system	100
1.6	Removing and installing radiator and radiator fan	102
20	- Fuel supply system	104
1	Removing and installing parts of fuel supply system	104
1.1	Removing and installing parts of fuel supply system	104
1.2	Removing and installing fuel tank with its attachments	105
1.3	Safety precautions when working on the fuel supply system	108
1.4	Rules for cleanliness	108
1.5	Servicing accelerator mechanism	109
1.6	Servicing cold start accelerator (CSA) operating cable	111
1.7	Adjusting CSA operating cable	112
21	- Charging	113
1	Charge air system with turbocharger	113
1.1	Charge air system with turbocharger	113
1.2	Removing and installing turbocharger with attachments	113
1.3	Removing and installing parts of charge air cooling system	124
1.4	Rules for cleanliness	127
1.5	Turbocharger hose/pipe connections	128
1.6	Removing and installing turbocharger	130
1.7	Checking turbocharger	134
1.8	Checking pressure unit for charge pressure regulating valve	137
1.9	Removing and installing pressure unit for charge pressure regulating valve	138
26	- Exhaust system	139
1	Removing and installing parts of exhaust system	139
1.1	Removing and installing parts of exhaust system	139
2	Exhaust gas recirculation system, engine codes 1Z and AHU	149
2.1	Exhaust gas recirculation system, engine codes 1Z and AHU	149
2.2	Removing and installing parts of exhaust gas recirculation system	150
2.3	Checking exhaust gas recirculation valve (mechanical)	151
2.4	Vacuum hose connection diagram	153
3	Exhaust gas recirculation system, engine code AFN	153
3.1	Exhaust gas recirculation system, engine code AFN	153
3.2	Removing and installing parts of exhaust gas recirculation system	154
3.3	Vacuum hose connection diagram	155
3.4	Checking exhaust gas recirculation valve	156
4	Exhaust gas recirculation system, engine code AAZ	158
4.1	Exhaust gas recirculation system, engine code AAZ	158
4.2	Removing and installing parts of exhaust gas recirculation system	158
4.3	Exhaust gas recirculation system	159
4.4	Checking exhaust gas recirculation	160
4.5	Checking exhaust gas recirculation valve	162
4.6	Checking two-way valve	162
4.7	Checking engine temperature sender	163
4.8	Checking and adjusting partial throttle switch	164