



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	4
1.3 Securing engine to assembly stand	6
1.4 Notes on installing	6
1.5 Tightening torques	7
1.6 Assembly mountings	7
1.7 Additional information and removal instructions for vehicles with air conditioner	9
13 - Crankshaft group	10
1 Dismantling and assembling engine	10
1.1 Dismantling and assembling engine	10
1.2 Removing and installing ribbed belt	22
2 Removing and installing sealing flange and flywheel	25
2.1 Removing and installing sealing flange and flywheel	25
2.2 Renewing crankshaft oil seal -pulley end	28
2.3 Removing and installing sealing flange, pulley end	31
3 Removing and installing crankshaft	34
3.1 Removing and installing crankshaft	34
3.2 Crankshaft dimensions	38
4 Dismantling and assembling pistons and conrods	39
4.1 Dismantling and assembling pistons and conrods	39
4.2 Checking piston projection at TDC	45
4.3 Piston and cylinder dimensions	46
15 - Cylinder head, Valve gear	47
1 Removing and installing cylinder head	47
1.1 Removing and installing cylinder head	47
1.2 Removing and installing cylinder head cover	55
1.3 Removing, installing and tensioning toothed belt	57
1.4 Removing and installing cylinder head	64
1.5 Checking compression pressures	67
2 Servicing valve gear	69
2.1 Servicing valve gear	69
2.2 Checking valve guides	76
2.3 Renewing valve stem seals	78
2.4 Removing and installing camshaft	80
2.5 Removing and installing camshaft oil seal	84
17 - Lubrication	86
1 Removing and installing parts of the lubrication system	86
1.1 Removing and installing parts of the lubrication system	86
1.2 Removing and installing sump	98
1.3 Checking oil pressure and oil pressure switch	100
19 - Cooling system	102



1	Removing and installing parts of cooling system	102
1.1	Removing and installing parts of cooling system	102
1.2	Parts of cooling system body side	103
1.3	Parts of cooling system engine side	106
1.4	Coolant hose connection diagram	110
1.5	Draining and filling cooling system	112
1.6	Removing and installing radiator	115
1.7	Removing and installing coolant pump	116
1.8	Removing and installing thermostat	118
20	Fuel supply system	120
1	Removing and installing parts of fuel supply system	120
1.1	Removing and installing parts of fuel supply system	120
1.2	Removing and installing fuel tank with its attachments	121
1.3	Servicing fuel filter	126
1.4	Safety precautions when working on the fuel supply system	128
1.5	Rules for cleanliness	129
1.6	Removing and installing fuel cooler	129
1.7	Removing and installing fuel tank	130
1.8	Removing and installing fuel delivery unit	132
1.9	Removing and installing fuel gauge sender	134
1.10	Checking fuel pump	135
1.11	Servicing accelerator mechanism	137
1.12	Checking tandem pump	138
1.13	Removing and installing tandem pump	140
21	Charging	143
1	Charge air system with turbocharger	143
1.1	Charge air system with turbocharger	143
1.2	Safety precautions	143
1.3	Rules for cleanliness	143
1.4	Removing and installing turbocharger with attachments	143
1.5	Removing and installing parts of charge air cooling	152
23	Mixture preparation, Injection	156
1	Servicing Diesel direct injection system	156
1.1	Servicing Diesel direct injection system	156
1.2	Safety precautions	156
1.3	Rules for cleanliness	156
1.4	Servicing intake manifold flap	157
1.5	Servicing unit injector	160
1.6	Removing and installing O rings for unit injector	162
1.7	Removing and installing unit injector	164
2	Engine control unit	168
2.1	Engine control unit	168
2.2	Interrogating and erasing engine control unit fault memory	168
2.3	Adapting functions and components	169
2.4	Removing and installing engine control unit	169
26	Exhaust system	171
1	Removing and installing parts of exhaust system	171
1.1	Removing and installing parts of exhaust system	171
1.2	Aligning exhaust system ensuring connections are stress-free	173
2	Exhaust gas recirculation system	174
2.1	Exhaust gas recirculation system	174
2.2	Removing and installing parts of exhaust gas recirculation system	175



28 - Ignition system	177
1 Checking glow plug system	177
1.1 Checking glow plug system	177
1.2 Checking glow plugs	178