



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	2
1.2 Securing engine to assembly stand	8
1.3 Notes on installing	8
1.4 Assembly mountings	9
13 - Crankshaft group	11
1 Dismantling and assembling engine	11
1.1 Assembly overview - toothed belt drive	11
1.2 Assembly overview - poly V-belt drive	13
1.3 Removing and installing poly V-belt	13
1.4 Assembly overview - crankcase	15
2 Removing and installing sealing flange and flywheel	17
2.1 Assembly overview - sealing flange and flywheel	17
2.2 Renewing crankshaft oil seal - pulley end	18
2.3 Removing and installing sealing flange - pulley end	20
2.4 Renewing crankshaft sealing flange - flywheel end	22
3 Crankshaft	31
3.1 Assembly overview - crankshaft	31
3.2 Crankshaft dimensions	32
4 Pistons and conrods	33
4.1 Assembly overview - pistons and conrods	33
4.2 Checking piston projection at TDC	36
4.3 Piston and cylinder dimensions	37
15 - Cylinder head, valve gear	38
1 Cylinder head	38
1.1 Assembly overview - cylinder head	38
1.2 Removing and installing cylinder head cover	41
1.3 Removing, installing and tensioning toothed belts	43
1.4 Removing and installing cylinder head	57
1.5 Checking compression	61
2 Repairing valve gear	64
2.1 Assembly overview - valve gear	64
2.2 Checking valve guides	66
2.3 Renewing valve stem seals	67
2.4 Removing and installing camshaft	69
2.5 Removing and installing camshaft oil seal	73
17 - Lubrication	76
1 Engine oil	76
1.1 Oil capacities	76
1.2 Engine oil specifications	76
1.3 Checking engine oil level	76
2 Parts of lubrication system	77
2.1 Assembly overview - oil pump, oil sump	77



2.2	Removing and installing oil sump	78
3	Oil filter bracket, oil cooler and oil pressure	82
3.1	Assembly overview - oil filter bracket and oil cooler	82
3.2	Checking oil pressure and oil pressure switch	83
19 - Cooling		85
1	Parts of cooling system	85
1.1	Parts of cooling system - body side	85
1.2	Parts of cooling system - engine side	87
1.3	Coolant hose schematic diagram	89
1.4	Draining and filling coolant	90
1.5	Removing and installing fan support with fans	92
1.6	Removing and installing radiator	93
1.7	Removing and installing coolant pump	95
1.8	Removing and installing thermostat	97
1.9	Checking cooling system for leaks	99
1.10	Checking oil cooler for leaks	101
20 - Fuel supply system		104
1	Removing and installing parts of fuel supply system	104
1.1	Safety precautions when working on fuel supply system	104
1.2	Rules for cleanliness	105
1.3	Assembly overview - fuel tank	105
1.4	Assembly overview - fuel filter	108
1.5	Removing and installing fuel cooler	109
1.6	Emptying fuel tank	109
1.7	Removing and installing fuel tank	112
1.8	Removing and installing fuel delivery unit	114
1.9	Removing and installing fuel sender	115
1.10	Checking fuel pump	116
1.11	Checking tandem pump	117
1.12	Removing and installing tandem pump	121
1.13	Assembly overview - accelerator mechanism	124
23 - Mixture preparation - injection		126
1	Repairing diesel direct injection system	126
1.1	Safety precautions	126
1.2	Rules for cleanliness	127
1.3	Assembly overview - unit injector	127
1.4	Removing and installing O-rings for unit injector	128
1.5	Removing and installing unit injector	130
1.6	Assembly overview - intake manifold with intake manifold flap	132
1.7	Assembly overview - air filter	134
2	Engine control unit	135
2.1	Reading and erasing engine control unit fault memory	135
2.2	Adapting functions and components	136
2.3	Removing and installing anti-theft engine control unit	137
26 - Exhaust system		140
1	Removing and installing parts of exhaust system	140
1.1	Assembly overview - exhaust manifold with catalytic converter and front exhaust pipe ..	140
1.2	Assembly overview - silencer with mountings	142
2	Exhaust gas recirculation system	145
2.1	Assembly overview - parts of exhaust gas recirculation	145
2.2	Vacuum hose schematic diagram	146
2.3	Checking exhaust gas recirculation valve (mechanical)	147



28 - Glow plug system	148
1 Checking glow plug system	148
1.1 Checking glow plugs	148