



Contents

00 - Technical data	1
1 Technical data	1
1.1 Engine number	1
1.2 Engine data	1
10 - Removing and installing engine	3
1 Removing and installing engine	3
1.1 Notes on removing	4
1.2 Notes on installing	8
1.3 Specified torques	9
1.4 Front engine mounting	10
1.5 Additional information and assembly work for vehicles with air conditioner	10
13 - Crankshaft group	12
1 Dismantling and assembling engine	12
1.1 Assembly overview	12
1.2 Removing and installing poly V-belt	18
2 Sealing flange and flywheel or drive plate	19
2.1 Assembly overview	19
2.2 Renewing crankshaft oil seal - pulley end	20
2.3 Removing and installing drive plate	21
2.4 Removing and installing sealing flange - pulley end	23
3 Crankshaft	26
3.1 Assembly overview	26
3.2 Pulling needle roller bearing out of and driving into crankshaft	28
3.3 Crankshaft dimensions	29
4 Pistons and conrods	30
4.1 Assembly overview	30
4.2 Separating new conrods	31
4.3 Pistons and cylinders	32
4.4 Checking piston projection at TDC	33
4.5 Piston and cylinder dimensions	34
15 - Cylinder head, valve gear	35
1 Cylinder head	35
1.1 Assembly overview	35
1.2 Removing, installing and tensioning toothed belt	37
1.3 Removing and installing cylinder head	48
1.4 Checking compression	51
2 Repairing valve gear	54
2.1 Assembly overview - valve gear	54
2.2 Reworking valve seats	57
2.3 Checking valve guides	58
2.4 Renewing valve stem seals	59
2.5 Removing and installing camshaft	60
2.6 Removing and installing camshaft oil seal	63
17 - Lubrication	66
1 Parts of lubrication system	66
1.1 Engine oil	66
1.2 Assembly overview - parts of lubrication system	67
1.3 Assembly overview - oil filter bracket	69



1.4	Removing and installing oil sump	70
1.5	Checking oil pressure and oil pressure switch	75
19 - Cooling	.....	78
1	Parts of cooling system	78
1.1	Assembly overview - parts of cooling system, body side	78
1.2	Assembly overview - parts of cooling system, engine side	82
1.3	Draining and filling coolant	87
1.4	Removing and installing radiator	90
1.5	Removing and installing coolant pump	92
1.6	Removing and installing thermostat	94
1.7	Removing and installing viscous fan coupling	96
1.8	Check fuel cooling pump V166	97
1.9	Check radiator fan V7	98
20 - Fuel supply system	.....	101
1	Parts of fuel supply system	101
1.1	Safety precautions when working on fuel supply system	101
1.2	Rules for cleanliness	101
1.3	Assembly overview - removing and installing fuel tank with attached components	102
1.4	Assembly overview - fuel filter	106
1.5	Fuel and coolant hose schematic diagram	109
1.6	Removing and installing fuel cooler	110
1.7	Removing and installing fuel tank	111
1.8	Removing and installing fuel pump	112
1.9	Removing and installing suction-jet pump	115
1.10	Checking fuel pump	117
1.11	Removing and installing fuel delivery unit	117
1.12	Removing and installing fuel gauge sender	122
1.13	Assembly overview - accelerator mechanism	122
1.14	Adjust accelerator position sender	124
1.15	Removing and installing tandem pump	125
1.16	Checking tandem pump	128
21 - Turbocharging/supercharging	.....	132
1	Charge air system with turbocharger	132
1.1	Assembly overview - turbocharger with attachments	132
1.2	Removing and installing parts of charge air cooling	134
1.3	Vacuum hose schematic diagram	138
1.4	Rules for cleanliness	138
23 - Mixture preparation - injection	.....	140
1	Repairing diesel direct injection system	140
1.1	Safety precautions	140
1.2	Rules for cleanliness	140
1.3	Overview of fitting locations	141
1.4	Assembly overview - intake manifold flap	143
1.5	Assembly overview - unit injector	143
1.6	Removing and installing O-rings for unit injector	144
1.7	Removing and installing unit injector	146
2	Engine control unit	151
2.1	Reading and clearing engine control unit event memory	151
2.2	Adapting functions and components	152
2.3	Removing and installing engine control unit	153
26 - Exhaust system	.....	155



1	Parts of the exhaust system	155
1.1	Assembly overview - four-wheel drive vehicles	155
1.2	Assembly overview - front-wheel drive vehicles	157
2	Exhaust gas recirculation system	159
2.1	Assembly overview - parts of exhaust gas recirculation	159
2.2	Checking exhaust gas recirculation valve (mechanical)	163
28 - Glow plug system		165
1	Checking glow plug system	165
1.1	Checking glow plugs	165

