



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	6
1.3 Notes on installing	7
1.4 Assembly mountings	8
1.5 Additional notes and assembly work for vehicles with air conditioner	9
13 - Crankshaft group	10
1 Dismantling and assembling engine	10
1.1 Assembly overview - toothed belt drive	10
1.2 Assembly overview - poly V-belt drive	11
1.3 Removing and installing poly V-belt	13
1.4 Assembly overview - crankcase	15
2 Sealing flange and flywheel	17
2.1 Assembly overview - sealing flange and flywheel, engine codes ASZ, ATD, AXR, BLT	17
2.2 Assembly overview - sealing flange and flywheel, engine code BMT	19
2.3 Renewing crankshaft oil seal - belt pulley end	20
2.4 Removing and installing sealing flange - belt pulley end	21
2.5 Renewing crankshaft sealing flange - flywheel end, engine code BMT	23
2.6 Removing and installing engine speed sender G28 , engine code BMT	30
3 Crankshaft	32
3.1 Assembly overview - crankshaft	32
3.2 Crankshaft dimensions	33
4 Pistons and conrods	35
4.1 Assembly overview - pistons and conrods	35
4.2 Separating new conrods	36
4.3 Checking pistons, piston rings and cylinder bores	37
4.4 Checking piston projection at TDC	38
4.5 Piston and cylinder dimensions	40
15 - Cylinder head, valve gear	41
1 Cylinder head	41
1.1 Assembly overview - cylinder head	41
1.2 Removing and installing cylinder head cover	44
1.3 Removing, installing and tensioning toothed belt	45
1.4 Removing and installing cylinder head	54
1.5 Checking compression	58
2 Valve gear	61
2.1 Assembly overview - valve gear	61
2.2 Checking valve guides	64
2.3 Renewing valve stem oil seals	65
2.4 Removing and installing camshaft	66
2.5 Removing and installing camshaft oil seal	70
17 - Lubrication	73
1 Engine oil	73



1.1	Oil capacities	73
1.2	Checking engine oil level	73
2	Parts of lubrication system	74
2.1	Assembly overview - parts of lubrication system	74
2.2	Removing and installing sump	75
2.3	Assembly overview - oil filter bracket	77
2.4	Checking oil pressure and oil pressure switch	78
2.5	Assembly overview - oil supply line	79
2.6	Removing and installing oil supply line	80
19	Cooling	83
1	Parts of cooling system	83
1.1	Assembly overview - parts of cooling system, body side	84
1.2	Assembly overview - parts of cooling system, engine side	87
1.3	Coolant hose schematic diagram	88
1.4	Draining and filling coolant	92
1.5	Removing and installing radiator	94
1.6	Removing and installing coolant pump	96
1.7	Removing and installing thermostat	97
1.8	Checking cooling system for leaks	99
1.9	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 with attachments	105
1.4	Assembly overview - fuel filter	108
1.5	Removing and installing fuel cooler	109
1.6	Removing and installing fuel tank	110
1.7	Removing and installing fuel delivery unit	111
1.8	Removing and installing fuel gauge sender G	113
1.9	Checking fuel pump	114
1.10	Assembly overview - accelerator mechanism	115
1.11	Checking tandem pump	116
1.12	Removing and installing tandem pump	119
21	Turbocharging/supercharging	123
1	Charge air system with turbocharger	123
1.1	Safety precautions	123
1.2	Rules for cleanliness	124
1.3	Disconnecting and reconnecting hose connections with push-in connectors	124
1.4	Hose connections with spring band ring	125
1.5	Assembly overview - turbocharger with attachments	125
1.6	Removing and installing turbocharger, engine code BMT	130
1.7	Assembly overview - parts of charge air cooling	132
1.8	Checking charge air system for leaks	134
23	Mixture preparation - injection	137
1	Repairing diesel direct injection system	137
1.1	Safety precautions	137
1.2	Rules for cleanliness	138
1.3	Assembly overview - intake manifold with intake manifold flap	138
1.4	Assembly overview - air filter	142
1.5	Assembly overview - unit injector	142
1.6	Removing and installing unit injector O-rings	143



1.7	Removing and installing unit injector	145
2	Engine control unit	149
2.1	Reading and clearing engine control unit fault memory	149
2.2	Adapting functions and components	149
2.3	Removing and installing engine control unit	150
26	Exhaust system	155
1	Exhaust system	155
1.1	Assembly overview - front exhaust pipe with catalytic converter and silencers	157
1.2	Assembly overview - front exhaust pipe with particulate filter	158
1.3	Assembly overview - silencer (vehicle with particulate filter)	160
1.4	Removing and installing front exhaust pipe with particulate filter	160
1.5	Aligning exhaust system stress free	163
2	Exhaust gas recirculation system	165
2.1	Assembly overview - parts of exhaust gas recirculation	165
2.2	Assembly overview - exhaust gas recirculation cooler, engine code BMT	169
2.3	Removing and installing exhaust gas recirculation cooler, engine code BMT	170
2.4	Schematic diagram for vacuum hoses	171
28	Ignition system	172
1	Checking glow plug system	172
1.1	Removing, installing and checking glow plugs	172
1.2	Characteristics of ceramic glow plugs	173
1.3	Removing, installing and checking ceramic glow plugs	173