

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 - vehicles with engine code letters AHL, ARM	3
1.2 Removing - vehicles with engine code letters ANA	14
1.3 Securing engine to engine stand	27
1.4 Installing engine	27
1.5 Tightening torques	30
13 - Crankshaft group	32
1 Dismantling and assembling engine	32
1.1 Lock carrier in service position - exploded view of components	32
1.2 Moving lock carrier into service position	32
1.3 Poly V-belt drive for power steering pump, alternator and viscous fan - exploded view of components	34
1.4 Poly V-belt drive for air conditioner - exploded view of components	37
1.5 Removing and installing poly V-belt	38
1.6 Removing and installing crankshaft pulley	40
1.7 Removing and installing bracket for ancillary units	41
1.8 Toothed belt drive - Overview of components	44
1.9 Removing and installing toothed belt	46
1.10 Removing toothed belt from camshaft sprocket	51
1.11 Positioning crankshaft at TDC for cylinder 1 with engine installed	53
1.12 Positioning crankshaft to TDC for cylinder 1 with engine removed	54
1.13 Checking semi-automatic tensioning roller for toothed belt	55
2 Removing and installing sealing flanges and flywheel/drive plate	56
2.1 Sealing flanges and flywheel/drive plate - exploded view of components	56
2.2 Renewing crankshaft oil seal (pulley end)	57
2.3 Removing and installing front sealing flange	60
2.4 Removing and installing sealing flange (rear)	63
2.5 Removing and installing flywheel	65
2.6 Removing and installing drive plate	66
3 Removing and installing crankshaft	69
3.1 Crankshaft - Exploded view of components	69
3.2 Extracting and driving in needle bearing for crankshaft	71
3.3 Crankshaft dimensions	72
3.4 Removing and installing chain sprocket	72
4 Dismantling and assembling pistons and conrods	75
4.1 Different conrods and conrod bolts	75
4.2 Piston with sawn conrod - exploded view of components	75
4.3 Piston with cracked conrods - exploded view of components	77
4.4 Piston and cylinder dimensions	79
15 - Cylinder head, valve gear	80
1 Removing and installing cylinder head	80
1.1 Cylinder head - exploded view of components	80
1.2 Removing and installing cylinder head cover	82
1.3 Removing cylinder head - vehicles with engine code letters AHL, ARM	84
1.4 Removing cylinder head - vehicles with engine code letters ANA	87



1.5	Installing cylinder head	91
1.6	Intake manifold (engine code letters AHL, ARM) - exploded view of components	95
1.7	Removing and installing intake manifold - vehicles with engine code letters AHL, ARM	96
1.8	Intake manifold (engine code letters ANA) - exploded view of components	98
1.9	Removing and installing intake manifold (top section) - vehicles with engine code letters ANA	99
1.10	Removing and installing intake manifold (bottom section) - vehicles with engine code letters ANA	101
1.11	Checking compression	102
2	Servicing valve gear	104
2.1	Exploded view of components	104
2.2	Checking axial clearance of camshaft	106
2.3	Renewing camshaft oil seal	106
2.4	Removing and installing camshaft	110
2.5	Checking hydraulic bucket tappets	112
2.6	Renewing valve stem oil seals	113
2.7	Checking valve guides	116
2.8	Checking valves	117
2.9	Renewing valve guides	117
2.10	Machining valve seats	119
17 - Lubrication		122
1	Removing and installing parts of lubrication system	122
1.1	Lubrication system - exploded view of components	122
1.2	Removing and installing sump	126
1.3	Removing and installing oil pump	135
1.4	Checking oil pressure and oil pressure switch	135
1.5	Engine oil	138
1.6	Checking oil level	138
19 - Cooling		140
1	Removing and installing parts of cooling system	140
1.1	Parts of cooling system - engine code letters AHL, ARM	140
1.2	Parts of cooling system - engine code letters ANA	142
1.3	Draining and filling cooling system	143
1.4	Removing and installing coolant pump	148
1.5	Removing and installing thermostat	152
1.6	Removing and installing coolant pipe (bottom)	155
1.7	Radiator and radiator fan - exploded view of components	156
1.8	Removing and installing radiator	157
1.9	Removing and installing viscous fan	160
1.10	Removing and installing bearing for viscous fan in bracket	161
1.11	Checking cooling system for leaks	164
26 - Exhaust system		167
1	Removing and installing parts of exhaust system	167
1.1	Exhaust system (engine code letters AHL, ARM) - exploded view of components	167
1.2	Exhaust system (engine code letters ANA) - exploded view of components	169
1.3	Separating centre and rear silencers	171
1.4	Removing and installing exhaust manifold - vehicles with engine code letters AHL, ARM	172
1.5	Removing and installing exhaust manifold - vehicles with engine code letters ANA	175
1.6	Removing and installing catalytic converter - vehicles with engine code letters ANA	177
1.7	Removing and installing front exhaust pipe - vehicles with engine code letters AHL, ARM	180
1.8	Removing and installing front exhaust pipe - vehicles with engine code letters ANA	182
1.9	Stress-free alignment of exhaust system	183

1.10	Checking exhaust system for leaks	183
2	Exhaust gas recirculation system - vehicles with engine code letters ANA	184
2.1	Exhaust gas recirculation system - exploded view of components	184
2.2	Checking adaption of zero position for exhaust gas recirculation valve N18	186
2.3	Electrical test of exhaust gas recirculation valve N18 and exhaust gas recirculation potentiometer G212	187
2.4	Removing and installing exhaust gas recirculation valve N18 with exhaust gas recirculation potentiometer G212	193
3	Secondary air system - vehicles with engine code letters ANA	194
3.1	Principle and function	194
3.2	Carrying out diagnosis of secondary air system	196
3.3	Checking secondary air inlet valve N112	198
3.4	Checking secondary air pump relay J299 and activation	203
3.5	Checking combination valve for secondary air system for proper operation and leakage ..	208
3.6	Removing and installing combination valve for secondary air system	210
3.7	Removing and installing secondary air pump	211