

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	3
1 Removing and installing engine	3
1.1 Removing and installing engine	3
1.2 Removing - vehicles with engine code AJM	4
1.3 Removing - vehicles with engine code AVF, AWX	22
1.4 Attaching engine to repair stand	39
1.5 Installing	39
1.6 Tightening torques	40
13 - Crankshaft group	43
1 Dismantling and assembling engine	43
1.1 Dismantling and assembling engine	43
1.2 Moving lock carrier to service position	43
1.3 Ribbed belt drive for vane pump, alternator and viscous fan	49
1.4 Removing and installing vibration damper	56
1.5 Ribbed belt drive for air conditioner - assembly overview	58
1.6 Routing of ribbed belts	61
1.7 Removing and installing ribbed belt	63
1.8 Removing and installing bracket for alternator, vane pump and viscous fan	65
1.9 Toothed belt drive	68
1.10 Removing and installing toothed belt	73
2 Removing and installing sealing flanges and flywheel	82
2.1 Removing and installing sealing flanges and flywheel	82
2.2 Renewing crankshaft oil seal - pulley end -	85
2.3 Removing and installing front sealing flange	88
2.4 Removing and installing dual mass flywheel	91
3 Removing and installing crankshaft	92
3.1 Removing and installing crankshaft	92
3.2 Removing and installing needle bearing in crankshaft	97
3.3 Crankshaft dimensions	98
3.4 Removing and installing chain sprocket	99
4 Dismantling and assembling pistons and conrods	100
4.1 Dismantling and assembling pistons and conrods	100
4.2 Different conrod versions	100
4.3 Cracked-steel conrods	101
4.4 Sawn conrods	105
4.5 Checking piston projection at TDC	112
4.6 Piston and cylinder dimensions	113
15 - Cylinder head, Valve gear	114
1 Removing and installing cylinder head	114
1.1 Removing and installing cylinder head	114
1.2 Part I	115
1.3 Part II	120
1.4 Removing and installing cylinder head cover	123
1.5 Removing and installing intake manifold	126
1.6 Removing cylinder head - vehicles with engine code AJM	129
1.7 Removing cylinder head - vehicles with engine code AVF, AWX	138



1.8	Installing cylinder head	147
1.9	Checking compression pressure	152
2	Servicing valve gear	154
2.1	Servicing valve gear	154
2.2	Checking camshaft axial clearance	161
2.3	Removing and installing camshaft oil seal	163
2.4	Removing and installing camshaft	166
2.5	Checking hydraulic bucket tappets	171
2.6	Renewing valve stem seals	173
2.7	Reworking valve seats	177
2.8	Checking valve guides	179
2.9	Checking valves	180
17	- Lubrication	181
1	Removing and installing parts of the lubrication system	181
1.1	Removing and installing parts of the lubrication system	181
1.2	Part I	182
1.3	Part II	187
1.4	Removing and installing sump	190
1.5	Removing and installing oil pump	199
1.6	Testing oil pressure and oil pressure switch	200
1.7	Engine oil	202
1.8	Checking oil level	202
19	- Cooling system	204
1	Removing and installing parts of cooling system	204
1.1	Removing and installing parts of cooling system	204
1.2	Parts of cooling system - vehicles with engine code AJM	205
1.3	Parts of cooling system - vehicles with engine codes AVF, AWX	210
1.4	Draining and filling cooling system	212
1.5	Removing and installing coolant pump	218
1.6	Removing and installing, checking coolant thermostat	219
1.7	Removing and installing upper coolant pipe	221
1.8	Removing and installing bottom coolant pipe - vehicles with engine code AJM	223
1.9	Removing and installing bottom coolant pipe - vehicles with engine code AVF, AWX	225
1.10	Radiator and radiator fan - exploded view (vehicles with engine code AJM)	228
1.11	Removing and installing viscous fan	233
1.12	Removing and installing bearing for viscous fan in bracket	236
1.13	Removing and installing radiator	238
1.14	Checking cooling system for leaks	242
1.15	Checking radiator fan -V7	244
1.16	Removing and installing radiator fan -V7	246
1.17	Testing fuel cooling pump -V166 (vehicles with engine code AJM)	247
1.18	Removing and installing water radiator for fuel cooling system (vehicles with engine code AJM)	253
21	- Charging	256
1	Testing charge air system with turbocharger	256
1.1	Testing charge air system with turbocharger	256
1.2	Requirements for testing charge air system with turbocharger	258
1.3	Consequences of leaks in intake system or exhaust system	258
1.4	Checking turbocharger and charge pressure control system	259
1.5	Checking charge pressure	259
1.6	Testing linkage and vacuum unit for charge pressure control system	262
1.7	Checking vacuum activation at turbocharger	265
1.8	Diagram of connections for charge pressure control system - vehicles with engine code AJM	268

1.9	Diagram of connections for charge pressure control system - vehicles with engine code AVF, AWX	270
1.10	Testing charge pressure control solenoid valve -N75	272
1.11	Testing intake manifold pressure sender -G71	277
2	Servicing charge air system with turbocharger	280
2.1	Servicing charge air system with turbocharger	280
2.2	Rules for cleanliness	280
2.3	Turbocharger: exploded view (vehicles with engine code AJM)	281
2.4	Removing and installing turbocharger - vehicles with engine code AJM	285
2.5	Turbocharger: exploded view (vehicles with engine code AVF, AWX)	291
2.6	Removing and installing turbocharger - vehicles with engine code AVF, AWX	295
2.7	Removing and installing parts of charge air cooling system	301
2.8	Removing and installing charge air cooler (intercooler)	303
26	- Exhaust system	304
1	Removing and installing parts of exhaust system	304
1.1	Removing and installing parts of exhaust system	304
1.2	Separating centre and rear silencers	308
1.3	Removing and installing exhaust manifold	310
1.4	Removing and installing catalytic converter and front exhaust pipe - vehicles with engine code AJM	311
1.5	Removing and installing catalytic converter and front exhaust pipe - vehicles with engine code AVF, AWX	314
1.6	Stress-free alignment of exhaust system	318
1.7	Checking exhaust system for leaks	320
2	Exhaust gas recirculation system	320
2.1	Exhaust gas recirculation system	320
2.2	Removing and installing parts of exhaust gas recirculation system	321
2.3	Diagram of EGR hose connections - vehicles with engine code AJM	323
2.4	Diagram of EGR hose connections - vehicles with engine code AVF, AWX	325
2.5	Checking mechanical exhaust gas recirculation valve	327
2.6	Testing exhaust gas recirculation	328
2.7	Checking exhaust gas recirculation valve -N18 - vehicles with engine code AJM	330
2.8	Checking exhaust gas recirculation valve -N18 - vehicles with engine code AVF, AWX	335