

Contents

00 - Technical data	1
1 Technical data	1
1.1 Engine number	1
1.2 Engine data	1
2 Safety precautions	2
2.1 Working on the fuel system	2
2.2 Procedure before opening high-pressure section of injection system	2
2.3 Working on the cooling system	3
2.4 Using testers and measuring instruments during a road test	3
2.5 Working on the exhaust system	3
3 General repair instructions	4
3.1 Rules for cleanliness when working on fuel supply system and injection system	4
3.2 Checking fuel system for leaks	4
3.3 Foreign particles in engine	4
3.4 Contact corrosion!	4
3.5 Routing and attachment of pipes, hoses and wiring	5
3.6 Checking vacuum system	5
3.7 Installing radiators and condensers	5
10 - Removing and installing engine	7
1 Removing and installing engine	7
1.1 Removing engine	7
1.2 Securing engine to assembly stand	23
1.3 Installing engine	24
13 - Crankshaft group	29
1 Dismantling and assembling engine	29
1.1 Lock carrier - exploded view	29
1.2 Moving lock carrier into service position	29
1.3 Poly V-belt for alternator, power steering pump and air conditioner compressor	32
1.4 Removing and installing poly V-belt	34
1.5 Removing and installing vibration damper	35
1.6 Removing and installing bracket for ancillaries	36
1.7 Toothed belt drive - exploded view	39
1.8 Removing, installing and tensioning toothed belt	41
1.9 Detaching toothed belt from camshaft sprocket	49
1.10 Removing and installing tensioner for toothed belt	52
2 Removing and installing sealing flanges and flywheel/dual-mass flywheel	56
2.1 Sealing flanges and flywheel/dual-mass flywheel - exploded view of components	56
2.2 Renewing crankshaft oil seal (pulley end)	58
2.3 Removing and installing sealing flange (front)	60
2.4 Removing and installing dual-mass flywheel - vehicles with manual gearbox	65
2.5 Removing and installing flywheel - vehicles with multitronic gearbox	66
2.6 Removing and installing sealing flange (rear)	67
3 Removing and installing crankshaft	70
3.1 Crankshaft - exploded view	70
3.2 Crankshaft dimensions	72
3.3 Extracting and driving in needle bearing for crankshaft	72
3.4 Removing and installing chain sprocket	74
4 Dismantling and assembling pistons and conrods	76
4.1 Pistons and conrods - exploded view	76
4.2 Piston and cylinder dimensions	79



15 - Cylinder head, valve gear	80
1 Removing and installing cylinder head	80
1.1 Cylinder head - exploded view	80
1.2 Removing and installing cylinder head cover	81
1.3 Removing and installing cylinder head	84
1.4 Checking compression	90
2 Removing and installing intake manifold	94
2.1 Intake manifold - exploded view	94
2.2 Removing and installing intake manifold	95
3 Servicing valve gear	97
3.1 Valve gear - exploded view	97
3.2 Checking axial clearance of camshafts	99
3.3 Renewing exhaust camshaft oil seal	100
3.4 Renewing inlet camshaft oil seal	103
3.5 Removing and installing camshafts and hydraulic chain tensioner	106
3.6 Renewing valve stem oil seals with cylinder head installed	117
3.7 Renewing valve stem oil seals with cylinder head removed	121
3.8 Checking hydraulic bucket tappets	125
3.9 Checking valves	126
3.10 Valve dimensions	126
3.11 Machining valve seats	126
3.12 Checking valve guides	128
3.13 Removing and installing camshaft control valve 1 N205	129
17 - Lubrication	132
1 Removing and installing parts of lubrication system	132
1.1 Sump and balance shaft assembly with oil pump - exploded view of components	132
1.2 Removing and installing sump and balance shaft assembly	135
1.3 Oil pump with balance shaft gear assembly - exploded view of components	147
1.4 Crankcase breather	149
1.5 Oil filter and oil cooler - exploded view of components	151
1.6 Removing and installing oil cooler	152
1.7 Removing and installing oil filter housing	152
1.8 Checking oil pressure and oil pressure switch	154
1.9 Engine oil	157
1.10 Checking oil level	158
19 - Cooling	159
1 Removing and installing parts of cooling system	159
1.1 Connection diagram - coolant hoses	159
1.2 Draining and filling cooling system	161
1.3 Removing and installing coolant pump	167
1.4 Removing and installing coolant pipe (top)	169
1.5 Removing and installing coolant pipe (bottom)	171
1.6 Thermostat housing - exploded view of components	172
1.7 Removing and installing thermostat housing with map-controlled engine cooling thermostat F265	173
1.8 Checking map-controlled engine cooling thermostat F265	174
1.9 Removing and installing radiator	176
1.10 Removing and installing radiator cowl	180
1.11 Removing and installing radiator fan	181
1.12 Renewing radiator fan motor	181
1.13 Checking cooling system for leaks	182
26 - Exhaust system	184

1	Removing and installing parts of exhaust system	184
1.1	Exhaust system - exploded view	184
1.2	Separating centre and rear silencers	186
1.3	Removing and installing front exhaust pipe	187
1.4	Removing and installing front exhaust pipe with catalytic converter	189
1.5	Removing and installing exhaust manifold	193
1.6	Stress-free alignment of exhaust system	195
1.7	Checking exhaust system for leaks	197