



Contents

00 - Technical data	1
1 Denomination	1
1.1 Engine number, engine data	1
2 Safety instructions	3
2.1 Safety precautions when working on fuel supply system	3
2.2 Safety measures for working on vehicles with start-stop system	3
2.3 Safety precautions during road tests in which testing and measuring equipment is used	3
2.4 Safety precautions when working on cooling system	4
2.5 Safety precautions when working on ignition system	4
2.6 General safety instructions	4
3 Repair notes	6
3.1 Rules of cleanliness	6
3.2 General repair instructions	6
3.3 Foreign bodies in the engine	7
3.4 Contact corrosion	7
3.5 Cable routing and securing	7
3.6 Assembly of radiators and condensers	7
3.7 Checking the vacuum system	7
3.8 General repair instructions	8
10 - Removing and installing engine	10
1 Removing and installing engine	10
1.1 Removing engine	10
1.2 Disconnecting engine and gearbox	22
1.3 Attach engine attached to engine and gearbox mount	24
1.4 Installing engine	25
2 Assembly bracket	31
2.1 Assembly overview - assembly mountings	31
2.2 Removing and installing engine mount	34
2.3 Removing and installing gearbox mount	35
2.4 Removing and installing pendulum support	37
2.5 Support the engine in its installed position	38
2.6 Adjusting the unit mounting	54
2.7 Check assembly bracket setting	57
13 - Crankshaft group	59
1 Cylinder block (pulley end)	59
1.1 Summary of components - V-ribbed belt drive	59
1.2 Removing and installing V-ribbed belt	67
1.3 Removing and installing tensioning pulley for V-ribbed belt	73
1.4 Removing and installing vibration dampener	74
1.5 Removing and installing engine support	77
1.6 Replacing crankshaft sealing ring on the belt pulley side	80
2 Cylinder block on gearbox side	84
2.1 Summary of components - cylinder block on gearbox side	84
2.2 removing and installing driver disc	88
2.3 Removing and installing flywheel	91
2.4 Removing and installing sealing flange on gearbox side	92
3 Crankshaft	104
3.1 Crankshaft dimensions	104
3.2 Measuring axial play of crankshaft	104
4 Pistons and conrods	106



4.1	Summary of components - piston and conrod	106
4.2	Removing and installing the piston	110
4.3	Check piston and cylinder bore	111
4.4	Removing and installing oil injection nozzles	114
4.5	Position piston to TDC	115
15	- Cylinder head, valve gear	121
1	Cylinder head	121
1.1	Summary of components - cylinder head	121
1.2	Summary of components - camshaft housing	123
1.3	Removing and installing cylinder head	125
1.4	Removing and installing camshaft housing	129
1.5	Checking compression	133
1.6	Checking the combustion chamber for tightness	135
2	Toothed belt drive	138
2.1	Summary of components - toothed belt guard	138
2.2	Summary of components - toothed belt	139
2.3	Removing and installing toothed belt guard	142
2.4	Removing and installing toothed belt	143
2.5	Pre-installing and fitting the timing tool	149
2.6	Checking valve timing	159
2.7	Setting the timing	164
2.8	Remove the toothed belt from the camshaft	180
3	Valve gear	186
3.1	Summary of components - valve gear	186
3.2	Measuring axial play of camshaft	188
3.3	Removing and installing gasket ring for camshaft	189
3.4	Removing and installing camshaft control	196
3.5	Removing and installing toothed belt wheel	200
3.6	Removing and installing camshaft control valve 1 N205	204
3.7	Removing and installing valve stem seals	204
4	Inlet and exhaust valves	217
4.1	inspecting valve guides	217
4.2	Testing valves	218
4.3	Valve dimensions	218
17	- Lubrication	219
1	Sump, oil pump	219
1.1	Summary of components - pan/oil pump	219
1.2	Removing and installing the bottom part of the oil sump	224
1.3	Removing and installing top part of the oil sump	230
1.4	Removing and installing oil pump	234
2	Engine oil cooler	237
2.1	Summary of components - engine oil cooler	237
2.2	Removing and installing engine oil cooler	237
3	Crankcase ventilation	239
3.1	Summary of components - crankcase ventilation	239
3.2	Removing and installing oil separator	240
4	Oil filter, oil pressure switch	243
4.1	Summary of components - oil filter/oil pressure switch	243
4.2	Removing and installing oil pressure switch F1	244
4.3	Testing oil pressure and oil pressure switch	245
4.4	Removing and installing oil filter housing	247
19	- Cooling	249



1	Cooling system, coolant	249
1.1	Connection diagram - coolant hoses	249
1.2	Check cooling system for leaks	250
1.3	Draining and filling coolant	254
2	Coolant pump, regulation of cooling system	261
2.1	Summary of components - coolant pump/thermostat	261
2.2	Summary of components - coolant temperature transmitter	264
2.3	Removing and installing coolant pump	265
2.4	Removing and installing coolant regulator	269
2.5	Removing and installing toothed belt pulley for coolant pump	272
2.6	Removing and installing coolant temperature transmitter G62	274
2.7	Removing and installing coolant temperature sender at radiator outlet G83	275
3	Coolant pipes	277
3.1	Summary of components - coolant pipe	277
3.2	Removing and installing coolant pipes	277
4	Radiator, radiator fan	280
4.1	Summary of components - radiator/radiator fan	280
4.2	Summary of components - fan shroud and radiator fan	282
4.3	Removing and installing radiator	282
4.4	Removing and installing radiator cowling with radiator fan	286
4.5	Removing and installing radiator fan V7	287
24	Mixture preparation - injection	288
1	Injection system	288
1.1	Installation location overview - fuel injection system	288
2	Injection valves	293
2.1	Summary of components - fuel distributor with injectors	293
2.2	Removing and installing the fuel distributor	294
2.3	Removing and installing injectors	297
2.4	Testing injection valves	297
2.5	Clean injectors	301
3	Air filter	304
3.1	Summary of components - air filter housing	304
3.2	Removing and installing air filter housing	306
4	Intake manifold	309
4.1	Summary of components - intake manifold	309
4.2	Removing and installing intake manifold	311
4.3	Removing and installing the throttle valve control unit GX3	313
4.4	Cleaning throttle valve control unit GX3	314
5	Senders and sensors	316
5.1	Removing and installing intake manifold pressure sender GX9	316
6	Engine control unit	318
6.1	Removing and installing engine control unit J623	318
7	Lambda probe	323
7.1	Summary of components - lambda probe	323
7.2	Removing and installing Lambda probe	324
26	Exhaust system	328
1	Exhaust pipes/silencers	328
1.1	Summary of components - silencers	328
1.2	Separating exhaust pipes/silencers	333
1.3	Removing and installing silencers	335
1.4	Align exhaust system free of stress	347
1.5	Inspecting the exhaust system for leaks	347



1.6	Installation position of clamping sleeve	348
2	Cleansing exhaust emissions	350
2.1	Summary of components - exhaust gas cleaning	350
2.2	Removing and installing catalytic converter	352
28	- Ignition system	356
1	Ignition system	356
1.1	Summary of components - ignition system	356
1.2	Removing and installing ignition coils with output stage	358
1.3	Removing and installing knock sensor 1 G61	361
1.4	Removing and installing Hall sender	361
1.5	Removing and installing the engine speed transmitter G28	362