



Contents

00 - Technical data	1
1 Safety information	1
1.1 Safety precautions when working on vehicles with a gas system	1
1.2 Safety regulations for working on fuel supply	3
1.3 Safety measures when working on vehicles with a start/stop system	3
1.4 Safety precautions when using testers and measuring instruments during a road test	4
1.5 Safety precautions when working on exhaust system	4
2 Identification	5
2.1 Engine number/engine data	5
3 Repair instructions	6
3.1 General information	6
10 - Removing and installing engine	8
1 Removing and installing engine	8
1.1 Removing engine	8
1.2 Securing engine on engine and gearbox support	12
1.3 Installing engine	14
2 Assembly mountings	17
2.1 Assembly overview - assembly mountings	17
13 - Crankshaft group	18
1 Cylinder block (pulley end)	18
1.1 Assembly overview - poly V-belt drive	18
1.2 Assembly overview - cylinder block (pulley end)	20
1.3 Removing and installing poly-V belt	21
1.4 Renewing crankshaft oil seal - belt pulley end	22
1.5 Removing and installing sealing flange on pulley end	25
2 Cylinder block, gearbox end	29
2.1 Assembly overview - cylinder block, gearbox end	29
2.2 Removing and installing sealing flange on gearbox side	30
3 Crankshaft	32
3.1 Assembly overview - crankshaft	32
3.2 Allocation of main bearing shells	33
3.3 Removing and installing sender wheel	34
3.4 Crankshaft dimensions	34
4 Pistons and conrods	35
4.1 Assembly overview - pistons and conrods	35
4.2 Checking pistons and cylinder bores	36
15 - Cylinder head, valve gear	39
1 Cylinder head	39
1.1 Assembly overview - cylinder head	39
1.2 Removing and installing cylinder head	41
1.3 Checking compression	46
2 Toothed belt drive	49
2.1 Assembly overview - toothed belt	49
2.2 Removing and installing toothed belt	51
3 Valve gear	57
3.1 Assembly overview - valve gear	57
3.2 Measuring axial play of camshaft	59
3.3 Removing and installing camshaft oil seal	59
3.4 Removing and installing camshaft	61



3.5	Removing and installing valve stem seals	64
4	Inlet and exhaust valves	67
4.1	Reworking valve seats	67
4.2	Checking valve guides	69
4.3	Valve dimensions	70
17	- Lubrication	71
1	Sump, oil pump	71
1.1	Assembly overview - sump/oil pump	71
1.2	Removing and installing oil sump	73
1.3	Removing and installing oil pump	75
1.4	Engine oil:	76
2	Oil filter, oil pressure switch	77
2.1	Assembly overview - oil filter/oil pressure switch	77
2.2	Checking oil pressure and oil pressure switch	78
19	- Cooling	80
1	Cooling system/coolant	80
1.1	Connection diagram - coolant hoses	80
1.2	Checking cooling system for leaks	80
1.3	Draining and adding coolant	82
2	Coolant pump, regulation of cooling system	91
2.1	Assembly overview - coolant pump, thermostat	91
2.2	Removing and installing coolant pump	92
2.3	Removing and installing thermostat	94
3	Radiator, radiator fan	96
3.1	Assembly overview - radiator/radiator fan	96
3.2	Removing and installing radiator	97
3.3	Removing and installing radiator fan	98
24	- Mixture preparation - injection	101
1	Injection system	101
1.1	Filling/bleeding fuel system	101
2	Injectors	104
2.1	Assembly overview - fuel rail with injectors	104
2.2	Removing and installing injectors	105
2.3	Checking injectors	106
3	Checking natural gas supply system for leaks	110
3.1	Distinguishing between pressure sections of natural gas supply system	110
3.2	Determining pressure of natural gas system	112
3.3	Determining operating mode of natural gas vehicles	113
3.4	Activating and deactivating natural gas mode	113
3.5	Checking gas system for leaks	114
4	Gas injectors	119
4.1	Assembly overview - gas rail with gas injectors	119
4.2	Removing and installing gas rail with gas injector N366 / N367 / N368 / N369	120
5	Gas pressure regulator	122
5.1	Assembly overview - gas pressure regulator	122
5.2	Removing and installing gas pressure regulator	124
6	Air filter	131
6.1	Assembly overview - air filter housing	131
7	Intake manifold	132
7.1	Assembly overview - intake manifold	132
7.2	Assembly overview - lower part of intake manifold with fuel rail	133



7.3	Removing and installing intake manifold upper part	133
8	Engine (motor) control unit	136
8.1	Removing and installing engine (motor) control unit J623	136
8.2	Removing and installing engine (motor) control unit J623 with protective housing	137
26	Exhaust system	139
1	Exhaust pipes and silencers	139
1.1	Assembly overview - silencers	139
1.2	Aligning exhaust system free of stress	140
1.3	Check exhaust system for leaks	141
1.4	Installation position of clamp	141
2	Exhaust gas cleaning	142
2.1	Assembly overview - emission control	142
2.2	Removing and installing catalytic converter	145
28	Ignition system	149
1	Ignition system	149
1.1	Assembly overview - ignition system	149
1.2	Test data, spark plugs	150