



## Contents

<b>00 - Technical data</b>	1
1     Engine number	1
2     Engine data	2
3     Numbering of cylinders	3
<b>10 - Removing and installing engine</b>	4
1     Removing and installing engine	4
1.1 Securing engine to assembly stand	11
1.2 Installing engine	12
2     Assembly mountings	16
2.1 Assembly overview - assembly mountings	16
2.2 Supporting engine in installation position	17
2.3 Removing and installing engine mounting	19
2.4 Removing and installing engine bracket or engine mounting	20
<b>13 - Crankshaft group</b>	22
1     Dismantling and assembling engine	22
1.1 Part I: assembly overview - toothed belt drive	23
1.2 Assembly overview - part II, cylinder block	25
1.3 Removing and installing poly-V belt	26
1.4 Checking alignment of poly V-belt	26
2     Assembly overview - sealing flanges and drive plate	28
2.1 Removing and installing sealing flange at drive plate end	30
2.2 Removing and installing drive plate	31
2.3 Renewing crankshaft oil seal, vibration damper end	33
<b>15 - Cylinder head, valve gear</b>	35
1     Assembly overview - cylinder head	35
1.1 Removing and installing cylinder head cover (right side)	37
1.2 Removing and installing left cylinder head cover	39
1.3 Removing, installing and tensioning toothed belt	41
1.4 Removing and installing left cylinder head	47
1.5 Removing and installing right cylinder head	50
1.6 Checking compression	53
2     Assembly overview - valve gear	55
2.1 Camshafts, checking axial clearance	58
2.2 Renewing camshaft oil seals	59
2.3 Renewing Hall sender seals	60
2.4 Removing and installing camshafts and camshaft adjusters - left cylinder head	62
2.5 Removing and installing camshafts and camshaft adjusters - right cylinder head	68
2.6 Removing and installing roller rocker finger	73
2.7 Renewing valve stem seals	74
2.8 Checking valve guides	78
2.9 Reworking valve seats	79
<b>17 - Lubrication</b>	81
1     Removing and installing parts of lubrication system	81
1.1 Engine oil	81
1.2 Checking oil level	82
1.3 Assembly overview - oil filter housing	82
1.4 Removing and installing oil filter housing	83
1.5 Assembly overview - sump	84



1.6	Removing and installing lower part of sump .....	85
1.7	Removing and installing upper part of sump .....	87
1.8	Removing and installing oil level and oil temperature sender G266 .....	91
1.9	Assembly overview - dismantling and assembling oil pump .....	92
1.10	Checking oil pressure and oil pressure switch .....	95
<b>19 - Cooling</b>	.....	<b>98</b>
1	<b>Removing and installing parts of cooling system</b> .....	<b>98</b>
1.1	Assembly overview - radiator .....	98
1.2	Assembly overview - radiator fan .....	100
1.3	Parts of cooling system, body side .....	101
1.4	Parts of cooling system - engine side, front .....	102
1.5	Parts of cooling system - engine side, rear .....	103
1.6	Parts of cooling system - engine side, right .....	104
1.7	Coolant hose connection diagram .....	105
1.8	Draining and adding coolant .....	106
1.9	Removing and installing fan mounting with fans .....	109
1.10	Removing and installing radiator fans .....	110
1.11	Removing and installing radiator .....	111
1.12	Removing and installing coolant pump and thermostat .....	113
1.13	Checking cooling system for leaks .....	115
<b>20 - Fuel supply system</b>	.....	<b>116</b>
1	<b>Removing and installing parts of fuel supply system</b> .....	<b>116</b>
1.1	Assembly overview - fuel tank with attachments and fuel filter .....	116
1.2	Assembly overview - right side fuel delivery unit, fuel gauge sender and suction-jet pump .....	118
1.3	Assembly overview - left side fuel delivery unit, fuel gauge sender and suction-jet pump .....	120
1.4	Schematic diagram of fuel lines and components in fuel tank .....	122
1.5	Safety regulations for working on fuel supply .....	123
1.6	Rules for cleanliness .....	124
1.7	Emptying fuel tank .....	124
1.8	Removing and installing fuel delivery unit, fuel gauge sender and suction-jet pump, right side .....	127
1.9	Removing and installing fuel delivery unit, fuel gauge sender and suction-jet pump, left side .....	130
1.10	Removing and installing fuel tank with attachments and fuel filter .....	132
1.11	Checking fuel pumps .....	135
1.12	Checking electronic power control (EPC) .....	143
2	<b>Activated charcoal filter system</b> .....	<b>146</b>
2.1	Assembly overview - parts of activated charcoal filter system .....	146
2.2	Checking activated charcoal filter system for leaks .....	148
3	<b>Activated charcoal filter system (vehicles with fuel system diagnostic pump V144 )</b> .....	<b>151</b>
3.1	Assembly overview - parts of activated charcoal filter system .....	151
<b>24 - Mixture preparation - injection</b>	.....	<b>153</b>
1	<b>Repairing injection system</b> .....	<b>153</b>
1.1	Assembly overview - intake manifold .....	153
1.2	Assembly overview - fuel rail with injectors .....	155
1.3	Assembly overview - air filter .....	156
1.4	Vacuum hoses on intake manifold .....	157
1.5	Removing and installing intake air duct to throttle valve module J338 .....	157
1.6	Safety precautions .....	160
1.7	Rules for cleanliness .....	161
1.8	Technical data .....	161



<b>2</b>	<b>Checking components</b>	162
2.1	Checking injectors	162
2.2	Checking fuel pressure regulator and holding pressure	164
<b>3</b>	<b>Engine (motor) control unit</b>	168
3.1	Removing and installing engine control unit	168
3.2	Reading and erasing engine control unit fault memory	168
<b>26</b>	<b>- Exhaust system</b>	170
1	<b>Exhaust manifold, catalytic converters and silencers with mountings</b>	170
1.1	Assembly overview - exhaust manifold with starter catalytic converters and attachments	170
1.2	Removing and installing starter catalytic converter with exhaust pipe	173
1.3	Assembly overview - silencers with mountings	173
<b>2</b>	<b>Lambda probes</b>	176
2.1	Removing and installing Lambda probe G39	176
2.2	Removing and installing Lambda probe after catalytic converter G130	177
2.3	Removing and installing Lambda probe 2 G108 and Lambda probe 2 after catalytic converter G131	178
<b>3</b>	<b>Secondary air system</b>	180
3.1	Assembly overview - parts of secondary air system, vehicle side	180
3.2	Assembly overview - parts of secondary air system, engine side	181
<b>28</b>	<b>- Ignition system</b>	183
1	<b>Repairing ignition system</b>	183
1.1	Assembly overview - parts of ignition system	183
1.2	Safety precautions	184
1.3	Removing and installing ignition coils with output stage	184
1.4	Test data, spark plugs	186

