



## Contents

<b>00 - Technical data . . . . .</b>	<b>1</b>
1 <b>Technical data . . . . .</b>	1
1.1    Technical data . . . . .	1
1.2    Engine number . . . . .	1
1.3    Engine data . . . . .	1
<b>10 - Removing and installing engine . . . . .</b>	<b>3</b>
1 <b>Removing and installing engine . . . . .</b>	3
1.1    Removing and installing engine . . . . .	3
1.2    Notes on removing . . . . .	4
1.3    Securing engine to assembly stand . . . . .	8
1.4    Notes on installing . . . . .	8
1.5    Tightening torques . . . . .	9
1.6    Assembly mountings . . . . .	10
1.7    Additional information and removal instructions for vehicles with air conditioner . . . . .	11
<b>13 - Crankshaft group . . . . .</b>	<b>12</b>
1 <b>Dismantling and assembling engine . . . . .</b>	12
1.1    Dismantling and assembling engine . . . . .	12
1.2    Removing and installing ribbed belt . . . . .	19
1.3    Checking semi-automatic toothed belt tensioning roller . . . . .	21
2 <b>Removing and installing sealing flange and flywheel . . . . .</b>	22
2.1    Removing and installing sealing flange and flywheel . . . . .	22
2.2    Renewing crankshaft oil seal -pulley end . . . . .	26
2.3    Removing and installing sealing flange, pulley end . . . . .	29
3 <b>Removing and installing crankshaft . . . . .</b>	32
3.1    Removing and installing crankshaft . . . . .	32
3.2    Crankshaft dimensions . . . . .	35
4 <b>Dismantling and assembling pistons and conrods . . . . .</b>	36
4.1    Dismantling and assembling pistons and conrods . . . . .	36
4.2    Checking piston projection at TDC . . . . .	42
4.3    Piston and cylinder dimensions . . . . .	43
<b>15 - Cylinder head, Valve gear . . . . .</b>	<b>44</b>
1 <b>Removing and installing cylinder head . . . . .</b>	44
1.1    Removing and installing cylinder head . . . . .	44
1.2    Removing, installing and tensioning toothed belt . . . . .	48
1.3    Removing and installing cylinder head . . . . .	54
1.4    Checking compression pressures . . . . .	60
2 <b>Servicing valve gear . . . . .</b>	62
2.1    Servicing valve gear . . . . .	62
2.2    Reworking valve seats . . . . .	68
2.3    Checking valve guides . . . . .	70
2.4    Renewing valve stem seals . . . . .	71
2.5    Removing and installing camshaft . . . . .	73
2.6    Checking hydraulic bucket tappets . . . . .	76
<b>17 - Lubrication . . . . .</b>	<b>78</b>
1 <b>Removing and installing parts of the lubrication system . . . . .</b>	78
1.1    Removing and installing parts of the lubrication system . . . . .	78
1.2    Removing and installing sump . . . . .	86
1.3    Checking oil pressure and oil pressure switch . . . . .	89



<b>19 - Cooling system . . . . .</b>	<b>92</b>
1 <b>Removing and installing parts of cooling system . . . . .</b>	<b>92</b>
1.1    Removing and installing parts of cooling system . . . . .	92
1.2    Parts of cooling system body side . . . . .	93
1.3    Parts of cooling system engine side . . . . .	97
1.4    Coolant hose connection diagram . . . . .	100
1.5    Draining and filling cooling system . . . . .	102
1.6    Removing and installing coolant pump . . . . .	105
1.7    Removing and installing radiator . . . . .	107
1.8    Removing and installing thermostat . . . . .	109
<b>20 - Fuel supply system . . . . .</b>	<b>111</b>
1 <b>Removing and installing parts of fuel supply system . . . . .</b>	<b>111</b>
1.1    Removing and installing parts of fuel supply system . . . . .	111
1.2    Removing and installing fuel tank with its attachments . . . . .	112
1.3    Servicing fuel filter . . . . .	117
1.4    Safety precautions when working on the fuel supply system . . . . .	120
1.5    Rules for cleanliness . . . . .	120
1.6    Removing and installing fuel tank . . . . .	121
1.7    Removing and installing fuel delivery unit . . . . .	123
1.8    Removing and installing fuel gauge sender . . . . .	125
1.9    Servicing accelerator mechanism . . . . .	126
<b>23 - Mixture preparation, Injection . . . . .</b>	<b>127</b>
1 <b>Servicing Diesel direct injection system . . . . .</b>	<b>127</b>
1.1    Servicing Diesel direct injection system . . . . .	127
1.2    Safety precautions . . . . .	127
1.3    Rules for cleanliness . . . . .	127
1.4    Servicing injection pump . . . . .	128
1.5    Dismantling and assembling intake manifold . . . . .	133
1.6    Removing and installing injection pump . . . . .	135
1.7    Removing and installing injectors . . . . .	140
1.8    Checking injectors . . . . .	141
1.9    Renewing injection timing device cover O-ring . . . . .	142
2 <b>Engine control unit . . . . .</b>	<b>143</b>
2.1    Engine control unit . . . . .	143
2.2    Removing and installing engine control unit . . . . .	143
2.3    Interrogating and erasing engine control unit fault memory . . . . .	143
2.4    Adapting functions and components . . . . .	144
<b>26 - Exhaust system . . . . .</b>	<b>146</b>
1 <b>Removing and installing parts of exhaust system . . . . .</b>	<b>146</b>
1.1    Removing and installing parts of exhaust system . . . . .	146
1.2    Dismantling and assembling exhaust system . . . . .	146
2 <b>Exhaust gas recirculation system . . . . .</b>	<b>150</b>
2.1    Exhaust gas recirculation system . . . . .	150
2.2    Removing and installing parts of exhaust gas recirculation system . . . . .	151
2.3    Connection diagram for vacuum hoses . . . . .	152
2.4    Checking exhaust gas recirculation valve (mechanical) . . . . .	153
<b>28 - Glow plug system . . . . .</b>	<b>154</b>
1 <b>Checking glow plug system . . . . .</b>	<b>154</b>
1.1    Checking glow plug system . . . . .	154
1.2    Checking glow plugs . . . . .	155