



## Contents

|  |           |
|--|-----------|
| <b>00 - Technical data</b>   | <b>1</b>  |
| <b>1 Technical data</b>  | <b>1</b>  |
| 1.1 Engine number  | 1         |
| 1.2 Engine characteristics   | 1         |
| <b>10 - Removing and installing engine</b>   | <b>2</b>  |
| <b>1 Engine - remove and install</b>   | <b>2</b>  |
| 1.1 Removal - recommendations  | 4         |
| 1.2 Engine - fasten to assembly stand  | 6         |
| 1.3 Installation notes   | 7         |
| 1.4 Tightening torques   | 8         |
| 1.5 Power-drive group supports, (torque)   | 8         |
| 1.6 Additional information and removal instructions for vehicles with air conditioning | 9         |
| <b>13 - Crankshaft group</b>   | <b>10</b> |
| <b>1 Engine - assembly and disassembly</b>   | <b>10</b> |
| 1.1 Poly-V belt - remove and install   | 15        |
| <b>2 Crankshaft flanges and flywheel - remove and install</b>                          | <b>18</b> |
| 2.1 Oil crankshaft seal, pulley side - replace   | 19        |
| 2.2 Crankshaft seal flange - replace   | 21        |
| <b>3 Balance shaft and mounting frame - remove and install</b>                         | <b>24</b> |
| 3.1 Balance shaft - remove and install   | 26        |
| <b>4 Crankshaft - remove and install</b>   | <b>30</b> |
| 4.1 Crankshaft dimensions  | 31        |
| <b>5 Pistons and bearing rods - disassemble and assemble</b>                           | <b>33</b> |
| 5.1 Piston and cylinder dimensions   | 37        |
| <b>15 - Cylinder head, valve gear</b>  | <b>38</b> |
| <b>1 Cylinder head - remove and install</b>  | <b>38</b> |
| 1.1 Toothed belt - remove and install, adjust  | 42        |
| 1.2 Cylinder head - remove and install   | 46        |
| 1.3 Compression - check  | 49        |
| <b>2 Valve command - repair</b>  | <b>52</b> |
| 2.1 Camshaft - check axial clearance   | 54        |
| 2.2 Valve seat - trim  | 55        |
| 2.3 Valve guides - check   | 57        |
| 2.4 Valve rod sealant - replace  | 57        |
| 2.5 Camshaft - remove and install  | 59        |
| <b>17 - Lubrication</b>  | <b>64</b> |
| <b>1 Lubrication system components - remove and install</b>                            | <b>64</b> |
| 1.1 Oil pan- remove and install  | 71        |
| 1.2 Check the oil pressure and the oil pressure switch.                                | 72        |
| <b>19 - Cooling</b>  | <b>75</b> |
| <b>1 Cooling system components - remove and install</b>                                | <b>75</b> |
| 1.1 Cooling system components on the body  | 75        |
| 1.2 Cooling system components, engine  | 77        |
| 1.3 Hose connection diagram for cooling system   | 78        |
| 1.4 Cooling system - drainage and replenishment  | 79        |
| 1.5 Radiator - remove and install  | 82        |
| 1.6 Water pump - remove and install  | 83        |



|           |   |            |
|-----------|---|------------|
| 1.7       | Thermostat - remove and install   | 84         |
| <b>20</b> | <b>Fuel supply system</b>   | <b>87</b>  |
| <b>1</b>  | <b>Fuel supply system components - removal and installation</b>         | <b>87</b>  |
| 1.1       | Fuel tank components with accessories - remove and install              | 87         |
| 1.2       | Fuel filter - repair  | 89         |
| 1.3       | Safety measures for working on fuel supply system                       | 91         |
| 1.4       | Cleaning rules  | 91         |
| 1.5       | Fuel reservoir - remove and install                                     | 92         |
| 1.6       | Fuel pump - remove and install  | 94         |
| 1.7       | Fuel gauge sensor - remove and install                                  | 95         |
| 1.8       | Fuel pump - check   | 96         |
| 1.9       | Accelerator mechanism - repair  | 97         |
| 1.10      | Auxiliary pump - check  | 98         |
| 1.11      | Auxiliary pump - remove and install                                     | 100        |
| <b>21</b> | <b>Turbocharging/supercharging</b>                                      | <b>104</b> |
| <b>1</b>  | <b>Supercharging system with turbocharger</b>                           | <b>104</b> |
| 1.1       | Safety measures   | 104        |
| 1.2       | Rules for cleaning  | 104        |
| 1.3       | Turbocharger - remove and install                                       | 104        |
| 1.4       | Intake air cooling system components (intercooler) - remove and install | 107        |
| <b>23</b> | <b>Mixture preparation - injection</b>                                  | <b>109</b> |
| <b>1</b>  | <b>Direct injection Diesel system maintenance</b>                       | <b>109</b> |
| 1.1       | Installation places - overview  | 109        |
| 1.2       | Safety measures   | 110        |
| 1.3       | Cleaning rules  | 111        |
| 1.4       | Intake manifold valve - repair  | 111        |
| 1.5       | Injectors - repair  | 112        |
| 1.6       | Injectors seal ring - remove and install                                | 113        |
| 1.7       | Nozzles - remove and install  | 114        |
| <b>2</b>  | <b>Engine command unit</b>  | <b>118</b> |
| 2.1       | Engine command unit - remove and install                                | 118        |
| 2.2       | Check the event memory in the engine command unit and delete it         | 118        |
| 2.3       | Adjust functions and components   | 120        |
| <b>26</b> | <b>Exhaust system</b>   | <b>122</b> |
| <b>1</b>  | <b>Exhaust system components - remove and install</b>                   | <b>122</b> |
| <b>2</b>  | <b>Exhaust gases recirculation system</b>                               | <b>124</b> |
| 2.1       | Exhaust gas recirculation system components - removal and installation  | 124        |
| 2.2       | Vacuum hose connection diagram  | 125        |
| <b>28</b> | <b>Ignition system</b>  | <b>126</b> |
| <b>1</b>  | <b>Preheating system - check</b>  | <b>126</b> |
| 1.1       | Checking heating plugs  | 127        |