



## Contents

|   |            |
|---|------------|
| <b>00 - Technical data</b>  | <b>1</b>   |
| 1 Engine number   | 1          |
| 2 Engine data   | 2          |
| <b>10 - Removing and installing engine</b>  | <b>4</b>   |
| 1 Removing and installing engine  | 4          |
| 1.1 Removing engine   | 5          |
| 1.2 Separating gearbox from engine and assembling   | 19         |
| 1.3 Securing engine to assembly stand   | 22         |
| 1.4 Installing engine   | 23         |
| 2 Assembly mountings  | 26         |
| 2.1 Assembly overview - assembly mountings (Golf, Eos, Passat, CC, Scirocco)              | 26         |
| 2.2 Assembly overview - assembly mountings (Tiguan)                                       | 28         |
| 2.3 Checking adjustment of assembly mountings   | 30         |
| 2.4 Adjusting assembly mountings (Passat 2006 ▶, CC)                                      | 30         |
| 2.5 Adjusting assembly mountings (Golf, Eos, Scirocco)                                    | 35         |
| 2.6 Adjusting assembly mounting (Tiguan)  | 40         |
| <b>13 - Crankshaft group</b>  | <b>45</b>  |
| 1 Cylinder block (pulley end)   | 45         |
| 1.1 Assembly overview - poly V-belt drive   | 45         |
| 1.2 Removing and installing poly-V belt   | 48         |
| 1.3 Removing and installing tensioner for poly V-belt (Passat 2006 ▶, CC)                 | 49         |
| 1.4 Removing and installing tensioner for poly V-belt (Golf, Eos, Scirocco)               | 54         |
| 1.5 Removing and installing tensioner for poly V-belt (Tiguan)                            | 59         |
| 1.6 Removing and installing bracket for ancillaries                                       | 63         |
| 1.7 Removing and installing vibration damper  | 65         |
| 1.8 Renewing oil seal for vibration damper  | 73         |
| 2 Cylinder block, gearbox end   | 76         |
| 2.1 Assembly overview - sealing flange on gearbox side and dual-mass flywheel/drive plate | 76         |
| 2.2 Removing and installing dual-mass flywheel  | 77         |
| 2.3 Removing and installing drive plate   | 79         |
| 2.4 Removing and installing sealing flange on gearbox side                                | 81         |
| 3 Crankshaft  | 90         |
| 3.1 Assembly overview - crankshaft  | 90         |
| 3.2 Pulling needle bearing out of and driving into crankshaft                             | 95         |
| 3.3 Crankshaft dimensions   | 97         |
| 3.4 Measuring axial clearance of crankshaft   | 97         |
| 3.5 Measuring radial clearance of crankshaft  | 98         |
| 4 Pistons and conrods   | 100        |
| 4.1 Assembly overview - pistons and conrods   | 100        |
| 4.2 Removing and installing pistons   | 104        |
| 4.3 Checking pistons and cylinder bores   | 106        |
| 4.4 Separating new conrod   | 108        |
| 4.5 Checking radial clearance of conrods  | 109        |
| <b>15 - Cylinder head, valve gear</b>   | <b>110</b> |
| 1 Chain drive   | 110        |
| 1.1 Assembly overview - timing chain covers   | 110        |
| 1.2 Removing and installing camshaft control valve 1 N205                                 | 113        |
| 1.3 Removing and installing upper timing chain cover                                      | 113        |
| 1.4 Removing and installing lower timing chain cover (Passat, CC)                         | 116        |



|           |   |            |
|-----------|---|------------|
| 1.5       | Removing and installing lower timing chain cover (Golf, Eos, Scirocco)  | 124        |
| 1.6       | Removing and installing bottom timing chain cover (Tiguan)  | 133        |
| 1.7       | Camshaft timing chain - exploded view   | 141        |
| 1.8       | Removing and installing camshaft timing chain   | 143        |
| 1.9       | Assembly overview - drive chain for balance shaft   | 160        |
| 1.10      | Removing and installing drive chain for balance shaft   | 163        |
| 1.11      | Removing and installing inlet side balance shaft  | 163        |
| 1.12      | Removing and installing exhaust side balance shaft  | 168        |
| 1.13      | Checking valve timing   | 171        |
| <b>2</b>  | <b>Cylinder head</b>  | <b>174</b> |
| 2.1       | Assembly overview - cylinder head   | 174        |
| 2.2       | Renewing oil non-return valve in cylinder head  | 178        |
| 2.3       | Removing and installing engine cover  | 179        |
| 2.4       | Removing and installing cylinder head   | 180        |
| 2.5       | Checking compression  | 227        |
| 2.6       | Removing and installing vacuum pump   | 229        |
| <b>3</b>  | <b>Valve gear</b>   | <b>231</b> |
| 3.1       | Assembly overview - valve gear  | 231        |
| 3.2       | Removing and installing camshaft  | 234        |
| 3.3       | Checking axial clearance of camshafts   | 255        |
| 3.4       | Renewing valve stem seals   | 256        |
| 3.5       | Checking valve guides   | 267        |
| <b>17</b> | <b>Lubrication</b>  | <b>269</b> |
| <b>1</b>  | <b>Sump and oil pump</b>  | <b>269</b> |
| 1.1       | Assembly overview - sump, oil pump  | 269        |
| 1.2       | Removing and installing coarse oil separator  | 272        |
| 1.3       | Removing and installing lower part of sump  | 273        |
| 1.4       | Removing and installing oil pump  | 276        |
| 1.5       | Removing and installing upper part of sump  | 279        |
| 1.6       | Removing and installing oil pressure control valve N428 (engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB)           | 284        |
| <b>2</b>  | <b>Engine oil:</b>  | <b>286</b> |
| <b>3</b>  | <b>Oil filter, engine oil cooler and oil pressure switch (engine codes CAWA, CAWB, CBFA, CCTA, CCTB, BZB, CGYA)</b> | <b>288</b> |
| 3.1       | Assembly overview - oil filter, engine oil cooler and oil pressure switch F1  | 288        |
| 3.2       | Removing and installing engine oil cooler   | 289        |
| 3.3       | Checking oil pressure and oil pressure switch   | 291        |
| <b>4</b>  | <b>Oil filter, engine oil cooler and oil pressure switch (engine codes CCZA, CCZB, CCZC, CCZD, CDAA, CDAB)</b>      | <b>294</b> |
| 4.1       | Assembly overview - oil filter, engine oil cooler   | 294        |
| 4.2       | Removing and installing engine oil cooler   | 296        |
| 4.3       | Removing and installing oil pressure switch F1  | 297        |
| 4.4       | Removing and installing oil pressure switch for reduced oil pressure F378   | 299        |
| 4.5       | Checking oil pressure and oil pressure switch   | 300        |
| <b>19</b> | <b>Cooling</b>  | <b>305</b> |
| <b>1</b>  | <b>Cooling system</b>   | <b>305</b> |
| 1.1       | Coolant hose connection diagram   | 305        |
| 1.2       | Draining and adding coolant   | 307        |
| 1.3       | Checking cooling system for leaks   | 315        |
| <b>2</b>  | <b>Coolant pump, thermostat, coolant pipes</b>  | <b>319</b> |
| 2.1       | Assembly overview - coolant pump, thermostat  | 319        |
| 2.2       | Removing and installing coolant pump with thermostat housing  | 322        |
| 2.3       | Detaching coolant pump from thermostat housing/attaching coolant pump to thermostat housing                         | 325        |



|           |  |            |
|-----------|--|------------|
| 2.4       | Removing and installing toothed belt for coolant pump                                      | 328        |
| 2.5       | Renewing oil seal for coolant pump drive   | 331        |
| 2.6       | Removing and installing thermostat   | 333        |
| 2.7       | Removing and installing coolant temperature sender G62                                     | 336        |
| 2.8       | Assembly overview - coolant pipes  | 339        |
| 2.9       | Removing and installing front coolant pipes  | 340        |
| 2.10      | Removing and installing small coolant pipe   | 344        |
| 2.11      | Continued coolant circulation pump V51 - exploded view                                     | 345        |
| 2.12      | Removing and installing continued coolant circulation pump V51                             | 346        |
| <b>3</b>  | <b>Radiator and radiator fans</b>  | <b>348</b> |
| 3.1       | Assembly overview - radiator, fan cowl and radiator fan (Passat, CC, Golf, Eos, Scirocco)  | 348        |
| 3.2       | Installing radiator identification sensor G611, engine code CBFA                           | 349        |
| 3.3       | Assembly overview - radiator, radiator cowl and radiator fan (Tiguan)                      | 350        |
| 3.4       | Removing and installing radiator cowl  | 352        |
| 3.5       | Removing and installing radiator fan V7 and radiator fan 2 V177                            | 354        |
| 3.6       | Removing and installing radiator (Passat, CC, Golf, Eos, Scirocco)                         | 354        |
| 3.7       | Removing and installing radiator (Tiguan)  | 355        |
| <b>20</b> | <b>Fuel supply system</b>  | <b>358</b> |
| <b>1</b>  | <b>Safety precautions</b>  | <b>358</b> |
| 1.1       | Safety regulations for working on fuel supply  | 358        |
| <b>2</b>  | <b>Rules for cleanliness</b>   | <b>360</b> |
| <b>3</b>  | <b>Fuel tank (Passat, CC)</b>  | <b>361</b> |
| 3.1       | Assembly overview - fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA, CDAB) | 361        |
| 3.2       | Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB)                              | 363        |
| 3.3       | Emptying fuel tank   | 365        |
| 3.4       | Removing and installing fuel tank  | 370        |
| <b>4</b>  | <b>Fuel tank (Golf, Scirocco)</b>  | <b>376</b> |
| 4.1       | Assembly overview - fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA)       | 376        |
| 4.2       | Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB)                              | 378        |
| 4.3       | Draining fuel tank (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CDAA)                  | 381        |
| 4.4       | Emptying fuel tank (engine codes CBFA, CCTA, CCTB)   | 388        |
| 4.5       | Removing and installing fuel tank  | 390        |
| <b>5</b>  | <b>Fuel tank (Tiguan)</b>  | <b>394</b> |
| 5.1       | Assembly overview - fuel tank  | 394        |
| 5.2       | Emptying fuel tank   | 397        |
| 5.3       | Removing and installing fuel tank  | 401        |
| <b>6</b>  | <b>Fuel tank (Eos)</b>   | <b>407</b> |
| 6.1       | Assembly overview - fuel tank (engine codes CAWA, CAWB, CCZA, CCZB)                        | 407        |
| 6.2       | Assembly overview - fuel tank (engine codes CBFA, CCTA, CCTB)                              | 410        |
| 6.3       | Emptying fuel tank   | 413        |
| 6.4       | Removing and installing fuel tank  | 419        |
| <b>7</b>  | <b>Repairing fuel supply (Passat, CC)</b>  | <b>423</b> |
| 7.1       | Removing and installing fuel delivery unit   | 423        |
| 7.2       | Removing and installing fuel gauge sender G  | 428        |
| 7.3       | Checking fuel pump   | 429        |
| <b>8</b>  | <b>Repairing fuel supply system (Golf, Eos, Scirocco)</b>                                  | <b>451</b> |
| 8.1       | Removing and installing fuel delivery unit   | 451        |
| 8.2       | Removing and installing fuel gauge sender G  | 455        |
| 8.3       | Checking fuel pump G6  | 456        |
| <b>9</b>  | <b>Repairing fuel supply (Tiguan)</b>  | <b>482</b> |
| 9.1       | Removing and installing fuel delivery unit   | 482        |
| 9.2       | Removing and installing fuel gauge sender G  | 487        |



|           |   |            |
|-----------|---|------------|
| 9.3       | Removing and installing suction-jet pump, fuel filter and pressure limitation valve   | 488        |
| 9.4       | Removing and installing fuel gauge sender 2 G169  | 491        |
| 9.5       | Removing and installing fuel pump control unit J538   | 492        |
| 9.6       | Checking fuel pump  | 495        |
| <b>10</b> | <b>Electronic power control (EPC)</b>   | <b>514</b> |
| 10.1      | Assembly overview - accelerator module  | 514        |
| 10.2      | Removing and installing accelerator pedal module  | 514        |
| <b>11</b> | <b>Activated charcoal filter system (Passat, CC, Tiguan)</b>  | <b>518</b> |
| 11.1      | Assembly overview - activated charcoal filter system (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CCZC, CCZD, CDAA, CDAB) | 518        |
| 11.2      | Assembly overview - activated charcoal filter system (engine codes CBFA, CCTA, CCTB)  | 519        |
| 11.3      | Checking fuel tank breather (engine codes BZB, CAWA, CAWB, CGYA, CCZA, CCZB, CCZC, CCZD, CDAA, CDAB)                          | 521        |
| 11.4      | Check fuel system for leaks (engine codes CBFA, CCTA, CCTB)   | 523        |
| <b>12</b> | <b>Activated charcoal filter system (Golf, Eos, Scirocco with engine codes CAWA, CAWB, BZB, CGYA, CCZA, CCZB, CDAA)</b>       | <b>533</b> |
| 12.1      | Assembly overview - activated charcoal filter system  | 533        |
| 12.2      | Checking fuel tank breather   | 534        |
| <b>13</b> | <b>Activated charcoal filter system (Golf, Eos with engine code CBFA, CCTA, CCTB)</b>   | <b>537</b> |
| 13.1      | Overview of activated charcoal filter system  | 537        |
| 13.2      | Assembly overview - activated charcoal filter system (Golf)   | 539        |
| 13.3      | Assembly overview - activated charcoal filter system (Eos)  | 540        |
| 13.4      | Removing and installing activated charcoal filter   | 541        |
| 13.5      | Removing and installing fuel system diagnostic pump V144 (Golf)   | 543        |
| 13.6      | Removing and installing fuel system diagnostic pump V144 (Eos)  | 544        |
| 13.7      | Checking fuel system for leaks  | 545        |
| <b>21</b> | <b>Turbocharging/supercharging</b>  | <b>556</b> |
| <b>1</b>  | <b>Turbocharger</b>   | <b>556</b> |
| 1.1       | Assembly overview - turbocharger  | 556        |
| 1.2       | Fitting hose connections with plug-in connectors  | 564        |
| 1.3       | Removing and installing turbocharger  | 565        |
| 1.4       | Checking vacuum unit for turbocharger   | 572        |
| 1.5       | Adjusting turbocharger vacuum unit (engine codes BZB, CGYA, CDAA, CDAB)   | 574        |
| 1.6       | Removing and installing vacuum unit for turbocharger  | 578        |
| <b>2</b>  | <b>Charge air system</b>  | <b>580</b> |
| 2.1       | Assembly overview - charge air cooling (Passat, CC, Tiguan, Eos)  | 580        |
| 2.2       | Assembly overview - charge air cooler (Golf, Scirocco)  | 581        |
| 2.3       | Assembly overview - sound generator (Golf, Scirocco)  | 583        |
| 2.4       | Actuator for structure-borne sound R214 and control unit for structure-borne sound J869                                       | 583        |
| 2.5       | Turbocharging - overview  | 585        |
| 2.6       | Removing and installing charge air cooler (Golf, Eos)   | 586        |
| 2.7       | Removing and installing charge air cooler (Passat, CC, Scirocco)  | 589        |
| 2.8       | Removing and installing charge air cooler, Tiguan   | 590        |
| 2.9       | Removing and installing charge air duct to sound generator (Golf, Scirocco)   | 591        |
| 2.10      | Checking charge air system for leaks  | 593        |
| <b>24</b> | <b>Mixture preparation - injection</b>  | <b>596</b> |
| <b>1</b>  | <b>Safety precautions and rules for cleanliness</b>   | <b>596</b> |
| 1.1       | General information on self-diagnosis   | 596        |
| <b>2</b>  | <b>Injection system</b>   | <b>597</b> |
| 2.1       | Technical data  | 597        |
| 2.2       | Overview of fitting locations   | 597        |
| 2.3       | Assembly overview - air filter  | 603        |
| 2.4       | Removing and installing air filter housing  | 605        |



|           |  |            |
|-----------|--|------------|
| 2.5       | Removing and installing air filter element   | 606        |
| 2.6       | Removing and installing air mass meter G70   | 607        |
| 2.7       | Assembly overview - intake manifold  | 608        |
| 2.8       | Assembly overview - fuel rail  | 610        |
| 2.9       | Removing and installing intake manifold with fuel rail   | 612        |
| 2.10      | Removing and installing injectors  | 621        |
| 2.11      | Renewing Teflon seal on injector   | 625        |
| 2.12      | Cleaning injectors   | 628        |
| 2.13      | Removing and installing fuel pressure sender G247  | 629        |
| 2.14      | Removing and installing throttle valve module J338   | 631        |
| 2.15      | Cleaning throttle valve module J338  | 632        |
| 2.16      | Assembly overview - high-pressure pump with fuel pressure regulating valve N276                | 634        |
| 2.17      | Removing and installing high-pressure pump   | 636        |
| <b>3</b>  | <b>Checking components</b>   | <b>639</b> |
| 3.1       | Checking fuel pressure sender G247   | 639        |
| 3.2       | Checking intake manifold change-over   | 642        |
| <b>4</b>  | <b>Engine control unit J623 (Passat, CC up to 11/10)</b>                                       | <b>645</b> |
| 4.1       | Removing and installing engine control unit  | 645        |
| 4.2       | Removing and installing engine control unit with protective housing                            | 646        |
| <b>5</b>  | <b>Engine control unit J623 (Golf, Eos to 11/08)</b>   | <b>649</b> |
| 5.1       | Removing and installing engine control unit  | 649        |
| 5.2       | Removing and installing engine control unit with protective housing                            | 649        |
| <b>6</b>  | <b>Engine control unit J623 (Golf, Eos, Scirocco from 11/08; CC from 11/10)</b>                | <b>654</b> |
| 6.1       | Removing and installing engine control unit  | 654        |
| 6.2       | Removing and installing engine control unit with protective housing                            | 656        |
| <b>7</b>  | <b>Engine control unit J623 (Tiguan)</b>   | <b>660</b> |
| 7.1       | Removing and installing engine control unit  | 660        |
| 7.2       | Removing and installing engine control unit with protective housing                            | 661        |
| <b>8</b>  | <b>Engine control unit J623 (Scirocco to 11/08)</b>  | <b>664</b> |
| 8.1       | Removing and installing engine control unit  | 664        |
| 8.2       | Removing and installing engine control unit with protective housing                            | 665        |
| <b>26</b> | <b>Exhaust system</b>  | <b>668</b> |
| <b>1</b>  | <b>Exhaust system (Passat, CC)</b>   | <b>668</b> |
| 1.1       | Assembly overview - exhaust system (engine codes BZB, CAWA, CAWB, CGYA)                        | 668        |
| 1.2       | Assembly overview - exhaust system (engine codes CCTA, CCTB, CCZA, CDAA, CDAB)                 | 670        |
| 1.3       | Assembly overview - exhaust system (engine code CBFA)  | 672        |
| 1.4       | Separating centre and rear silencers   | 674        |
| 1.5       | Aligning exhaust system free of stress   | 676        |
| 1.6       | Installation position and specified torque of clamp  | 677        |
| 1.7       | Removing and installing catalytic converters with front exhaust pipe                           | 679        |
| 1.8       | Checking exhaust system for leaks  | 682        |
| <b>2</b>  | <b>Exhaust system (Golf, Eos, Scirocco)</b>  | <b>683</b> |
| 2.1       | Assembly overview - exhaust system (engine code CAWB)  | 683        |
| 2.2       | Assembly overview - exhaust system (Golf 2004 ►, Eos, Scirocco, engine codes CCTA, CCZA, CCZB) | 685        |
| 2.3       | Assembly overview - exhaust system (engine code CBFA)  | 687        |
| 2.4       | Assembly overview - exhaust system (Golf 2009►, engine codes CCZA, CCZB)                       | 689        |
| 2.5       | Assembly overview - exhaust system (Golf 2009 ►, engine codes CCTA, CDAA)                      | 691        |
| 2.6       | Separating centre and rear silencers   | 693        |
| 2.7       | Aligning exhaust system free of stress   | 695        |
| 2.8       | Installation position and specified torque of clamp  | 696        |
| 2.9       | Removing and installing catalytic converters with front exhaust pipe                           | 697        |
| 2.10      | Checking exhaust system for leaks  | 700        |
| <b>3</b>  | <b>Exhaust system (Tiguan)</b>   | <b>701</b> |



|           |  |            |
|-----------|--|------------|
| 3.1       | Assembly overview – exhaust system (engine codes CCTA, CCTB, CCZA, CCZB, CCZC, CCZD) ..... | 701        |
| 3.2       | Assembly overview - exhaust system (engine codes CAWB, CCZA) .....                         | 703        |
| 3.3       | Separating centre and rear silencers .....   | 705        |
| 3.4       | Aligning exhaust system free of stress .....   | 706        |
| 3.5       | Removing and installing catalytic converters with front exhaust pipe .....                 | 708        |
| 3.6       | Installation position and specified torque of clamp .....                                  | 713        |
| 3.7       | Checking exhaust system for leaks .....  | 714        |
| <b>4</b>  | <b>Secondary air system - engine code CBFA .....</b>                                       | <b>715</b> |
| 4.1       | Assembly overview - secondary air system .....   | 715        |
| 4.2       | Removing and installing secondary air pump motor V101 .....                                | 715        |
| 4.3       | Removing and installing secondary air inlet valve N112 .....                               | 716        |
| <b>28</b> | <b>- Ignition system .....</b>   | <b>718</b> |
| <b>1</b>  | <b>Repairing ignition system .....</b>   | <b>718</b> |
| 1.1       | General notes on ignition system .....   | 718        |
| 1.2       | Safety precautions .....   | 718        |
| 1.3       | Assembly overview - ignition system .....  | 719        |
| 1.4       | Removing and installing ignition coils with output stage .....                             | 719        |
| 1.5       | Removing and installing knock sensor 1 G61 .....   | 721        |
| 1.6       | Removing and installing engine speed sender G28 .....                                      | 722        |
| 1.7       | Test data, spark plugs .....   | 723        |