Contents

01 - Self-diagnosis 1

1 General notes onself-diagnosis 1
1.1 General notes onself-diagnosis 1
1.2 Features of self-diagnosis 1
1.3 Technical data of self-diagnosis 1
1.4 Significance of EPC warning lamp (fault lamp for electronic accelerator) in dash panel insert 2
1.5 Significance of exhaust emissions warning lamp 3
1.6 Connecting vehicle diagnostic, testing and information system VAS 5051 and selecting engine electronics control units 4
1.7 Connecting fault reader V.A.G 1551 and selecting engine control unit 7

2 Fault memory 9
2.1 Fault memory 9
2.2 Interrogating and erasing fault memory of engine control unit 9
2.3 Automatic test sequence 11

3 Fault table: from V.A.G code 16486 / SAE P0 codes 11
3.1 Fault table: from V.A.G code 16486 / SAE P0 codes 11

4 Fault table: from V.A.G code 17510 / SAE P1 codes 18
4.1 Fault table: from V.A.G code 17510 / SAE P1 codes 18

5 Final control diagnosis 29
5.1 Final control diagnosis 29
5.2 Performing final control diagnosis 29

6 Readiness code 35
6.1 Readiness code 35
6.2 Reading readiness code 35
6.3 Generating readiness code 36

7 Measured value blocks (datablocks) 41
7.1 Measured value blocks (datablocks) 41
7.2 Safety precautions 41
7.3 Read measured value block 41

8 Evaluating measured value blocks, display groups 0...6 -Basic functions- 42
8.1 Evaluating measured value blocks, display groups 0...6 -Basic functions- 42

9 Evaluating measured value blocks, display groups 10...29 -Ignition- 47
9.1 Evaluating measured value blocks, display groups 10...29 -Ignition- 47

10 Evaluating measured value blocks, display grps 30...49, 99 -Lambda regulation- 50
10.1 Evaluating measured value blocks, display grps 30...49, 99 -Lambda regulation- 50

11 Evaluating measured value blocks, display groups 50...69 -Speed regulation- 55
11.1 Evaluating measured value blocks, display groups 50...69 -Speed regulation- 55

12 Evaluating measured value blocks, display groups 70...75 -Exhaust gas recirculation- 58
12.1 Evaluating measured value blocks, display groups 70...75 -Exhaust gas recirculation- 58

13 Evaluating measured value blocks, display group 100 -Readiness code- 59
13.1 Evaluating measured value blocks, display group 100 -Readiness code- 59

14 Evaluating measured value blocks, display groups 120...129 -Communication- 60
14.1 Evaluating measured value blocks, display groups 120...129 -Communication- 60

24 - Mixture preparation, Injection 62

1 General notes on the injection system 62
1.1 General notes on the injection system 62
1.2 Servicing injection system 63
1.3 Fitting locations overview 63
1.4 Wiring and component check with test box V.A.G 1598/31 66
1.5 Removing and installing parts of the injection system 68

1.6 Dismantling and assembling intake manifold 77
1.7 Dismantling and assembling fuel rail with injectors 80
1.8 Safety precautions 84
1.9 Rules for cleanliness 85
1.10 Technical data 85
2 Checking components 85
2.1 Checking components 85
2.2 Checking lambda probe heating for lambda probe before catalytic converter 85
2.3 Checking lambda probe heating for lambda probe after catalytic converter 88
2.4 Testing accelerator position senders 92
2.5 Checking throttle valve control part 95
2.6 Checking intake manifold pressure sender 96
2.7 Checking intake air temperature sender 100
2.8 Checking coolant temperature sender 104
2.9 Checking engine speed sender 107
2.10 Checking injectors 109
2.11 Checking fuel pressure regulator and holding pressure 115
2.12 Checking intake air system for leaks (unmetered air) 118
3 Checking functions 119
3.1 Checking functions 119
3.2 Idling check 119
3.3 Checking lambda probe and lambda regulation before catalytic converter 121
3.4 Checking lambda probe and lambda regulation after catalytic converter 125
3.5 Checking ageing of lambda probe before catalytic converter 128
3.6 Checking engine operating mode 129
4 Engine control unit 130
4.1 Engine control unit 130
4.2 Checking control unit voltage supply 130
4.3 Procedure after voltage supply open circuit 132
4.4 Replacing engine control unit 133
4.5 Coding engine control unit 134
4.6 Coding variants of engine control unit 135
4.7 Adapting engine control unit to throttle valve control part 136
4.8 Testing fuel pump relay -J17 and activation 138
5 Checking additional signals 142
5.1 Checking additional signals 142
5.2 Checking speed signal 142
5.3 Testing cruise control system (CCS) 144
5.4 Checking signal from brake light switch and brake pedal switch 146
5.5 Testing clutch pedal switch -F36 149
5.6 Checking rpm signal 151
5.7 Checking data bus 152

28 - Ignition system 156
1 Servicing ignition system 156
1.1 Servicing ignition system 156
1.2 General notes on ignition system 156
1.3 Removing and installing parts of the ignition system 157
1.4 Safety precautions 159
1.5 Test data, spark plugs 160
1.6 Checking Hall sender 161
1.7 Checking ignition transformer 162
1.8 Checking knock sensor 166
1.9 Checking misfiring recognition 167