



Contents

01 - Self-diagnosis	1
1 General to self-diagnosis	1
1.1 General to self-diagnosis	1
1.2 Features of self-diagnosis	1
1.3 Significance of EPC warning lamp (fault lamp for electronic accelerator) in dash panel insert	1
1.4 Significance of exhaust emissions warning lamp	2
1.5 Technical data of self-diagnosis	3
1.6 Connecting fault reader	4
2 Fault memory	7
2.1 Fault memory	7
2.2 Interrogating and erasing fault memory	7
3 Fault table: From V.A.G code 16395 / SAE P0 or P2 codes	9
3.1 Fault table: From V.A.G code 16395 / SAE P0 or P2 codes	9
4 Fault table: from V.A.G code 17455 / SAE P1 and P3 codes	15
4.1 Fault table: from V.A.G code 17455 / SAE P1 and P3 codes	15
5 Final control diagnosis	25
5.1 Final control diagnosis	25
5.2 Performing final control diagnosis	25
6 Readiness code	41
6.1 Readiness code	41
6.2 Reading readiness code	41
6.3 Generating readiness code	42
7 Measured value blocks	52
7.1 Measured value blocks	52
7.2 Safety precautions	52
7.3 Read measured value block	52
8 Evaluating measured value blocks, display groups 0...8 -Basic functions-	53
8.1 Evaluating measured value blocks, display groups 0...8 -Basic functions-	53
9 Evaluating measured value blocks, display groups 10...29 -Ignition-	58
9.1 Evaluating measured value blocks, display groups 10...29 -Ignition-	58
10 Evaluating measured value blocks, display grps. 30...33, 99 -Lambda regulation-	61
10.1 Evaluating measured value blocks, display grps. 30...33, 99 -Lambda regulation-	61
11 Evaluating measured value blocks, display groups 50...69 -Speed regulation-	65
11.1 Evaluating measured value blocks, display groups 50...69 -Speed regulation-	65
12 Evaluating measured value blocks, display groups 70...78 -Reducing emissions-	69
12.1 Evaluating measured value blocks, display groups 70...78 -Reducing emissions-	69
13 Evaluating measured block values, display groups 90...95 -Performance improvement-	70
13.1 Evaluating measured block values, display groups 90...95 -Performance improvement-	70
14 Evaluating measured value blocks, display groups 120...126 -Communication-	71
14.1 Evaluating measured value blocks, display groups 120...126 -Communication-	71
24 - Mixture preparation, Injection	73
1 Servicing injection system	73
1.1 Servicing injection system	73
1.2 Fitting locations overview	73
1.3 General notes on injection	78
1.4 Removing and installing parts of the injection system	79
1.5 Dismantling and assembling intake manifold	88
1.6 Dismantling and assembling fuel distributor	91
1.7 Dismantling and assembling air cleaner	93



1.8	Safety precautions	95
1.9	Rules for cleanliness	97
1.10	Technical data	97
2	Checking components	98
2.1	Checking components	98
2.2	Checking Lambda probe heating for Lambda probe before catalytic converter	98
2.3	Checking Lambda probe heating for Lambda probe after catalytic converter	101
2.4	Checking air mass meter	104
2.5	Checking throttle valve control part	108
2.6	Checking coolant temperature sender	112
2.7	Checking intake air temperature sender	117
2.8	Checking engine speed sender	121
2.9	Checking injectors	123
2.10	Checking fuel pressure regulator and holding pressure	130
2.11	Checking intake manifold change-over	133
2.12	Checking intake air system for leaks (unmetered air)	134
3	Checking functions	136
3.1	Checking functions	136
3.2	Idling check	136
3.3	Adapting idling speed	137
3.4	Checking Lambda probe and Lambda regulation before catalytic converter	138
3.5	Checking Lambda probe and Lambda regulation after catalytic converter	141
3.6	Checking Lambda probe ageing of Lambda probe 1 bank 1	144
3.7	Checking Lambda probe ageing Lambda probe after catalytic converter (trim regulation)	145
3.8	Checking engine operating mode	146
4	Engine control unit	148
4.1	Engine control unit	148
4.2	Checking control unit voltage supply	148
4.3	Procedure after voltage supply open circuit	150
4.4	Replacing engine control unit	151
4.5	Coding engine control unit	152
4.6	Erasing values learnt by engine electronics control unit	153
4.7	Adapting engine control unit to throttle valve control part	154
4.8	Learning kick-down point	155
5	Checking additional signals	156
5.1	Checking additional signals	156
5.2	Checking speed signal	156
5.3	Checking signal from/to air conditioning system	157
5.4	Checking signal from clutch pedal switch	159
5.5	Checking signal from brake light switch and brake pedal switch	160
5.6	Checking driving range signal	161
5.7	Checking kick-down point	162
5.8	Checking matching resistor of data bus	163
28	Glow plug system	164
1	Servicing ignition system	164
1.1	Servicing ignition system	164
1.2	General notes on ignition system	164
1.3	Removing and installing parts of the ignition system	165
1.4	Safety precautions	170
1.5	Test data, spark plugs	171
1.6	Checking Hall sender	172
1.7	Checking ignition coils with output stage	175
1.8	Checking knock sensor	178
1.9	Check misfiring detection	182