



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 Technical data of self-diagnosis	1
1.4 Significance of the exhaust gas warning lamp	2
1.5 Significance of EPC warning lamp (fault lamp for electronic accelerator) in dash panel insert	3
1.6 Connecting fault reader	4
2 Fault memory	7
2.1 Fault memory	7
2.2 Automatic test sequence for interrogating all fault memories	7
2.3 Interrogating and erasing engine control unit fault memory	8
3 Fault table: SAE P0 and P2 codes	9
3.1 Fault table: SAE P0 and P2 codes	9
4 Fault table: SAE P1 and P3 codes	15
4.1 Fault table: SAE P1 and P3 codes	15
5 Final control diagnosis	21
5.1 Final control diagnosis	21
5.2 Performing final control diagnosis	21
6 Readiness code	30
6.1 Readiness code	30
6.2 Reading readiness code	30
7 Measured value blocks	31
7.1 Measured value blocks	31
7.2 Safety precautions	31
7.3 Read measured value block	31
8 Evaluating measured value blocks, display groups 0...9 -Basic functions-	32
8.1 Evaluating measured value blocks, display groups 0...9 -Basic functions-	32
9 Evaluating measured value blocks, display groups 10...29 -Ignition-	36
9.1 Evaluating measured value blocks, display groups 10...29 -Ignition-	36
10 Evaluating measured value blocks, display groups 30...49, 107 -Lambda regulation- . . .	39
10.1 Evaluating measured value blocks, display groups 30...49, 107 -Lambda regulation-	39
11 Evaluating measured value blocks, display groups 50...69 -Speed regulation-	44
11.1 Evaluating measured value blocks, display groups 50...69 -Speed regulation-	44
12 Evaluating measured value blocks, display groups 70...89 -Reducing emissions-	48
12.1 Evaluating measured value blocks, display groups 70...89 -Reducing emissions-	48
13 Evaluating measured value blocks, display groups 120...129 -Communication-	48
13.1 Evaluating measured value blocks, display groups 120...129 -Communication-	48
24 - Mixture preparation, Injection	50
1 Servicing injection system	50
1.1 Servicing injection system	50
1.2 Fitting locations overview	50
1.3 General notes on injection	58
1.4 Dismantling and assembling intake manifold - Upper part	59
1.5 Dismantling and assembling intake manifold - lower part	61
1.6 Dismantling and assembling air cleaner	63
1.7 Safety precautions	64
1.8 Rules for cleanliness	66
1.9 Technical data	66



2	Checking components	66
2.1	Checking components	66
2.2	Checking Lambda probe heating for Lambda probe before catalyst	66
2.3	Checking Lambda probe heating for Lambda probe after catalyst	70
2.4	Checking air mass meter	73
2.5	Checking throttle valve control part	76
2.6	Checking coolant temperature sender	79
2.7	Checking intake air temperature sender	84
2.8	Checking engine speed sender	88
2.9	Checking injectors	90
2.10	Checking fuel pressure regulator and holding pressure	96
2.11	Checking intake air system for leaks (unmetered air)	99
3	Checking functions	100
3.1	Checking functions	100
3.2	Idling check	100
3.3	Checking Lambda probe and Lambda regulation before catalyst	101
3.4	Checking Lambda probe and Lambda regulation after catalyst	105
3.5	Checking Lambda probe ageing, Lambda probe before catalyst	108
3.6	Checking engine operating mode	109
4	Engine control unit	110
4.1	Engine control unit	110
4.2	Checking control unit voltage supply	110
4.3	Replacing engine control unit	112
4.4	Adapting engine control unit to throttle valve control part	114
4.5	Checking matching resistor for data bus	115
5	Checking additional signals	116
5.1	Checking additional signals	116
5.2	Checking speed signal	116
5.3	Checking signal from/to air conditioning system	118
5.4	Checking signal from clutch pedal switch	119
5.5	Checking signal from brake light switch and brake pedal switch	120
28	- Ignition system	122
1	Servicing ignition system	122
1.1	Servicing ignition system	122
1.2	General notes on ignition system	122
1.3	Removing and installing parts of the ignition system	123
1.4	Safety precautions	126
1.5	Test data, spark plugs	127
1.6	Checking Hall sender	128
1.7	Checking ignition transformer	129
1.8	Checking knock sensor	132
1.9	Check misfiring recognition	135