

## Contents

<b>01</b>	<b>Self-diagnosis</b>	<b>Page</b>
	<b>General to self-diagnosis</b> .....	<b>01-1</b>
	– Features of self-diagnosis .....	01-1
	– Technical data of self-diagnosis .....	01-2
	– Significance of EPC warning lamp (fault lamp for electronic accelerator) in dash panel insert .....	01-6
	– Significance of exhaust emissions warning lamp .....	01-8
	– Connecting fault reader .....	01-10
	<b>Fault memory</b> .....	<b>01-16</b>
	– Interrogating and erasing fault memory of engine control unit .....	01-16
	– Automatic test sequence .....	01-19
	<b>Fault table: SAE P0 codes</b> .....	<b>01-21</b>
	<b>Fault table: SAE P1 codes</b> .....	<b>01-35</b>
	<b>Final control diagnosis</b> .....	<b>01-63</b>
	– Performing final control diagnosis .....	01-63
	<b>Readiness code</b> .....	<b>01-72</b>
	– Function .....	01-72
	– Reading readiness code .....	01-73
	– Generating readiness code .....	01-75
	<b>Measured value blocks</b> .....	<b>01-88</b>
	– Safety precautions.....	01-88
	– Read measured value block .....	01-88
	<b>Evaluating measured value blocks, display groups 0...9 -Basic functions-</b> .....	<b>01-92</b>
	<b>Evaluating measured value blocks, display groups 10...29 -Ignition-</b> .....	<b>01-104</b>
	<b>Evaluating measured value blocks, display grps 30...49, 99 -Lambda regulation-</b> .....	<b>01-118</b>
	<b>Evaluating measured value blocks, display groups 50...69 -Speed regulation-</b> .....	<b>01-133</b>
	<b>Evaluating measured value blocks, display groups 70...79 -Reducing emissions-</b> .....	<b>01-145</b>
	<b>Evaluating measured value blocks, display group 100 -Readiness code-</b> .....	<b>01-148</b>
<b>24</b>	<b>Mixture preparation, Injection</b>	<b>Page</b>
	<b>Servicing injection system</b> .....	<b>24-1</b>
	– Fitting locations overview .....	24-1
	– General notes on injection.....	24-4
	– Removing and installing parts of the injection system .....	24-6
	– Dismantling and assembling intake manifold .....	24-15
	– Dismantling and assembling fuel rail with injectors .....	24-18
	– Dismantling and assembling air cleaner .....	24-21
	– Safety precautions.....	24-25
	– Rules for cleanliness.....	24-27
	– Technical data.....	24-28
	<b>Checking components</b> .....	<b>24-29</b>
	– Checking Lambda probe heating before catalyst .....	24-29
	– Checking Lambda probe heating after catalyst.....	24-34
	– Checking throttle valve control part.....	24-39
	– Checking intake manifold pressure sender .....	24-46
	– Checking intake air temperature sender .....	24-48
	– Checking coolant temperature sender .....	24-56
	– Checking engine speed sender.....	24-65
	– Checking injectors .....	24-69
	– Checking fuel pressure regulator and holding pressure .....	24-79
	– Checking intake air system for leaks (unmetered air) .....	24-84
	– Checking intake air preheating.....	24-88
	<b>Checking functions</b> .....	<b>24-89</b>
	– Idling check .....	24-89
	– Checking Lambda probe and Lambda regulation before catalyst .....	24-94
	– Checking Lambda probe and Lambda regulation after catalyst .....	24-101
	– Checking ageing of Lambda probe before catalyst.....	24-110
	– Checking engine operating mode .....	24-113

<b>Engine control unit</b> .....	<b>24-117</b>
– Checking control unit voltage supply .....	24-117
– Procedure after voltage supply open circuit .....	24-121
– Replacing engine control unit.....	24-123
– Coding engine control unit .....	24-126
– Coding variations of engine control unit .....	24-129
– Erasing learnt values and adapting engine control unit to throttle valve control part and exhaust gas recirculation valve.....	24-130
– Adapting engine control unit to electronic immobilizer.....	24-136
<b>Checking additional signals</b> .....	<b>24-140</b>
– Checking speed signal .....	24-140
– Checking signal from/to air conditioning system.....	24-144
– Checking signal from clutch pedal switch.....	24-148
– Checking signal from brake light switch and brake pedal switch.....	24-152
– Checking rpm signal.....	24-155
– Checking data bus .....	24-157

**28**

<b>Ignition system</b>	<b>Page</b>
<b>Servicing ignition system</b> .....	<b>28-1</b>
– General notes on ignition system .....	28-1
– Removing and installing parts of the ignition system.....	28-3
– Safety precautions.....	28-6
– Test data, spark plugs .....	28-8
– Checking Hall sender.....	28-9
– Checking ignition transformer .....	28-12
– Checking knock sensor.....	28-18
– Check misfiring recognition .....	28-22