



## Contents

<b>01 - Self-diagnosis . . . . .</b>	<b>1</b>
<b>1    Self-diagnosis . . . . .</b>	<b>1</b>
1.1    Self-diagnosis . . . . .	1
1.2    Features of self-diagnosis . . . . .	1
1.3    Technical data of self-diagnosis . . . . .	1
1.4    Connecting fault reader V.A.G 1551 and selecting engine control unit . . . . .	2
1.5    Connecting Vehicle Diagnosis, Testing and Information system VAS 5051 and selecting engine electronics control unit . . . . .	4
1.6    Interrogating fault memory . . . . .	6
1.7    Erasing fault memory . . . . .	7
<b>2    Fault table . . . . .</b>	<b>9</b>
2.1    Fault table . . . . .	9
<b>3    Final control diagnosis . . . . .</b>	<b>20</b>
3.1    Final control diagnosis . . . . .	20
3.2    Performing final control diagnosis . . . . .	20
<b>4    Measured value blocks . . . . .</b>	<b>24</b>
4.1    Measured value blocks . . . . .	24
4.2    Safety precautions . . . . .	24
4.3    Reading measured value block . . . . .	24
4.4    Evaluating measured value blocks . . . . .	25
<b>23 - Mixture preparation, Injection . . . . .</b>	<b>35</b>
<b>1    Servicing Diesel direct injection system . . . . .</b>	<b>35</b>
1.1    Servicing Diesel direct injection system . . . . .	35
1.2    Safety precautions . . . . .	35
1.3    Rules for cleanliness . . . . .	36
1.4    Fitting locations overview . . . . .	37
1.5    Servicing injection pump . . . . .	42
1.6    Removing, installing and checking intake connecting piece . . . . .	46
1.7    Removing and installing injection pump . . . . .	48
1.8    Dynamically checking and adjusting commencement of injection . . . . .	56
1.9    Removing and installing injectors . . . . .	58
1.10    Servicing injectors . . . . .	59
1.11    Renewing injection timing device cover O-ring . . . . .	60
<b>2    Checking components and functions . . . . .</b>	<b>60</b>
2.1    Checking components and functions . . . . .	60
2.2    Checking Diesel direct injection system voltage supply . . . . .	60
2.3    Checking engine speed sender . . . . .	62
2.4    Checking coolant temperature sender . . . . .	64
2.5    Checking intake air temperature sender . . . . .	66
2.6    Checking intake manifold temperature sender . . . . .	69
2.7    Checking fuel temperature sender . . . . .	71
2.8    Checking modulating piston movement sender and quantity adjuster . . . . .	74
2.9    Checking needle lift sender . . . . .	79
2.10    Checking injection timing control range . . . . .	81
2.11    Checking intake manifold flap change-over . . . . .	84
2.12    Checking intake manifold flap change-over valve . . . . .	86
<b>3    Checking additional signals . . . . .</b>	<b>89</b>
3.1    Checking additional signals . . . . .	89
3.2    Checking speed signal . . . . .	89
3.3    Checking signals from brake light switch and brake pedal switch . . . . .	91
3.4    Checking signal from clutch pedal switch . . . . .	92
3.5    Checking engine speed signal . . . . .	94



3.6	Checking data bus . . . . .	95
<b>4</b>	<b>Replacing, coding and matching engine control unit . . . . .</b>	<b>96</b>
4.1	Replacing, coding and matching engine control unit . . . . .	96
4.2	Replacing engine control unit . . . . .	96
4.3	Coding engine control unit . . . . .	97
4.4	Matching engine control unit to electronic immobilizer . . . . .	98
<b>28 - Glow plug system . . . . .</b>		<b>99</b>
1	<b>Checking glow plug system . . . . .</b>	<b>99</b>
1.1	Checking glow plug system . . . . .	99
1.2	Checking glow plugs . . . . .	100