



Contents

00 - Technical data	1
1 Engine number	1
2 Engine data	2
10 - Removing and installing engine	3
1 Removing and installing engine	3
1.1 Removing engine	4
1.2 Securing engine on engine and gearbox support VAS 6095	10
1.3 Installing engine	11
1.4 Specified torques for assembly mounting	13
13 - Crankshaft group	15
1 Dismantling and assembling engine	15
1.1 Part I	16
1.2 Part II	19
1.3 Removing and installing vibration damper (engine code BWS)	20
1.4 Removing and installing bracket for ancillaries	21
1.5 Removing and installing poly-V belt	22
2 Sealing flange and flywheel or drive plate	24
2.1 Assembly overview - sealing flanges and flywheel	24
2.2 Assembly overview - sealing flanges and drive plate	25
2.3 Assembly overview - timing chain covers	26
2.4 Removing and installing crankshaft seal on gearbox side	27
2.5 Removing and installing sealing flange on gearbox side	28
2.6 Removing and installing flywheel	31
2.7 Removing and installing drive plate	32
2.8 Renewing crankshaft sealing flange, vibration damper side	33
3 Assembly overview - crankshaft	36
3.1 Fitting sender wheel to crankshaft	37
3.2 Pulling needle bearing out of and driving into crankshaft	38
3.3 Allocation of crankshaft bearing shells (classification)	40
4 Pistons and conrods	42
4.1 Checking piston and cylinder	43
4.2 Piston and cylinder dimensions	47
15 - Cylinder head, valve gear	48
1 Cylinder head	48
1.1 Assembly overview - cylinder head	48
1.2 Removing and installing cylinder head	51
1.3 Checking valve timing	58
1.4 Installing camshaft adjuster with timing chain for camshaft drive	64
1.5 Installing timing chain for oil pump drive and camshaft drive	71
1.6 Removing and installing cylinder head cover	76
1.7 Assembly overview - mechanical vacuum pump	79
1.8 Removing and installing mechanical vacuum pump	79
1.9 Installing cover oil seals	81
1.10 Checking compression	82
2 Valve gear	86
2.1 Assembly overview - valve gear	86
2.2 Camshafts, checking axial clearance	88
2.3 Assembly overview - timing housing	89
2.4 Removing and installing camshaft control valves	90



2.5	Removing and installing camshafts	94
2.6	Camshaft identification	101
2.7	Renewing valve stem seals	101
2.8	Valve dimensions	104
2.9	Checking valve guides	104
2.10	Reworking valve seats	105
17	- Lubrication	107
1	Parts of lubrication system	107
1.1	Engine oil:	107
1.2	Assembly overview - sump, oil pump and oil filter bracket	108
1.3	Removing and installing sump	110
1.4	Removing and installing oil pump	113
1.5	Assembly overview – oil filter housing	117
1.6	Checking oil pressure and oil pressure switch	118
19	- Cooling	121
1	Parts of cooling system	121
1.1	Assembly overview - parts of cooling system, body side	122
1.2	Assembly overview - additional cooler	123
1.3	Assembly overview - cooling system, engine side	124
1.4	Coolant hose connection diagram	126
1.5	Draining and adding coolant	127
1.6	Removing and installing fan mounting with fans	130
1.7	Removing and installing radiator	132
1.8	Removing and installing coolant pump	134
1.9	Removing and installing thermostat	136
1.10	Checking cooling system for leaks	138
20	- Fuel supply system	141
1	Safety precautions and rules for cleanliness	141
1.1	Safety measures when working on fuel supply	141
1.2	Releasing pressure in high-pressure area	142
1.3	Rules for cleanliness	143
2	Fuel tank, vehicles with four-wheel drive	144
2.1	Rules for cleanliness	144
2.2	Assembly overview - fuel tank	144
2.3	Emptying fuel tank	146
2.4	Removing and installing fuel tank	152
2.5	Removing and installing fuel gauge sender 2 G169	156
2.6	Removing and installing suction-jet pump	159
3	Repairing fuel supply	161
3.1	Rules for cleanliness	161
3.2	Removing and installing fuel delivery unit	161
3.3	Removing and installing fuel gauge sender G	165
3.4	Checking fuel pump	166
4	Electronic power control (EPC)	176
4.1	Assembly overview - accelerator module	176
4.2	Removing and installing accelerator pedal module	176
5	Activated charcoal filter system	179
5.1	Function	179
5.2	Assembly overview - activated charcoal filter system	179
5.3	Checking fuel system for leaks	180
24	- Mixture preparation - injection	188



1	Injection system	188
1.1	General notes on the injection system	189
1.2	Rules for cleanliness	189
1.3	Technical data	190
1.4	Assembly overview - intake manifold	190
1.5	Assembly overview - fuel rail with high-pressure pump and injectors	191
1.6	Assembly overview - air filter	194
1.7	Assembly overview - sound generator with resonance air pipe	195
1.8	Checking intake air preheating	195
1.9	Removing and installing intake manifold upper part	196
1.10	Removing and installing lower part of intake manifold with fuel rail	199
1.11	Removing and installing high-pressure pump	202
1.12	Checking fuel pressure sender G247	204
1.13	Removing and installing injectors	206
1.14	Renewing Teflon seal and support washer on injector	209
2	Engine control unit J623	214
2.1	Removing and installing engine (motor) control unit J623	214
2.2	Removing and installing anti-theft engine control unit J623 (with locking plate)	215
2.3	Removing and installing anti-theft engine control unit J623 (with locking clip)	219
26 - Exhaust system		222
1	Parts of the exhaust system	222
1.1	Assembly overview - exhaust manifold, front exhaust pipe with catalytic converters and front silencers	224
1.2	Removing and installing exhaust manifold	226
1.3	Removing and installing Lambda probe G39 and Lambda probe 2 G108	227
1.4	Removing and installing front exhaust pipes with catalytic converters and front silencers	228
1.5	Assembly overview - silencers with mountings	231
28 - Ignition system		235
1	Ignition system	235
1.1	General notes on ignition system	235
1.2	Assembly overview - ignition system	235
1.3	Test data, spark plugs	237
1.4	Removing and installing ignition coils with output stage	237