



Contents

00 - Technical data	1
1 Technical data	1
1.1 Engine number	1
1.2 Engine data	1
10 - Removing and installing engine	2
1 Removing and installing engine	2
1.1 Notes on removing	3
1.2 Securing engine to assembly stand	7
1.3 Notes on installing	7
1.4 Aligning engine and gearbox mountings	8
1.5 Specified torques Volkswagen	9
1.6 Assembly mountings	10
1.7 Additional information and assembly work for vehicles with air conditioner	10
13 - Crankshaft group	12
1 Dismantling and assembling engine	12
1.1 Assembly overview - parts I and II	12
1.2 Assembly overview - part I, belt drive	14
1.3 Assembly overview - part II, cylinder block	15
1.4 Removing and installing poly V-belt	17
2 Dismantling and assembling cylinder block, crankshaft and flywheel	19
2.1 Assembly overview	19
2.2 Removing and installing engine speed sender G28	20
2.3 Crankshaft dimensions	21
2.4 Renewing crankshaft oil seal - belt pulley end	21
2.5 Tightening procedure for poly V-belt pulley securing bolt	23
2.6 Renewing crankshaft sealing flange - flywheel end	24
3 Dismantling and assembling pistons and conrods	32
3.1 Assembly overview	32
3.2 Piston and cylinder dimensions	34
15 - Cylinder head, valve gear	36
1 Cylinder head	36
1.1 Assembly overview	36
1.2 Checking valve timing	39
1.3 Checking semi-automatic toothed belt tensioner	40
1.4 Removing, installing and tensioning toothed belt	43
1.5 Removing and installing camshaft housing	49
1.6 Removing and installing cylinder head	52
1.7 Checking compression	55
2 Repairing valve gear	58
2.1 Assembly overview	58
2.2 Reworking valve seats	61
2.3 Removing and installing camshaft adjuster and exhaust camshaft pulley	62
2.4 Removing and installing spring in camshaft adjuster	69
2.5 Renewing camshaft oil seals	74
2.6 Checking valve guides	77
2.7 Renewing valve guides	78
2.8 Renewing valve stem seals	78
17 - Lubrication	81
1 Removing and installing parts of lubrication system	81



1.1	Assembly overview	81
1.2	Removing and installing oil sump	84
1.3	Removing and installing oil pump	86
1.4	Checking oil pressure and oil pressure switch	89
19	- Cooling	91
1	Removing and installing parts of cooling system	91
1.1	Assembly overview - parts of cooling system, body side	91
1.2	Assembly overview - parts of cooling system, engine side	93
1.3	Assembly overview - coolant distributor housing	95
1.4	Coolant hose schematic diagram	96
1.5	Draining and filling coolant	97
1.6	Removing and installing radiator	99
1.7	Removing and installing coolant pump	100
20	- Fuel supply system	103
1	Removing and installing parts of fuel supply system	103
1.1	Assembly overview - fuel tank with attachments and fuel filter	103
1.2	Safety precautions when working on fuel supply system	106
1.3	Rules for cleanliness	106
1.4	Removing and installing fuel gauge sender G	107
1.5	Removing and installing fuel delivery unit	107
1.6	Removing and installing fuel tank	109
1.7	Crash fuel shut-off	110
1.8	Checking fuel pump	110
1.9	Removing and installing high-pressure pump	116
2	Checking electronic power control (EPC)	119
2.1	Assembly overview	119
3	Activated charcoal filter system	120
3.1	Assembly overview	120
3.2	Checking fuel tank breather	121
24	- Mixture preparation - injection	123
1	Repairing injection system	123
1.1	Assembly overview - parts of injection system	123
1.2	Assembly overview - intake manifold	125
1.3	Assembly overview - fuel rail with injectors	128
1.4	Assembly overview - fuel pressure regulator and fuel metering valve	130
1.5	Assembly overview - air filter	131
1.6	Cleaning throttle valve module J338	131
1.7	Removing and installing injectors	132
1.8	Safety precautions	136
1.9	Rules for cleanliness	137
1.10	Technical data	137
2	Checking components	138
2.1	Checking fuel pressure regulator and holding pressure	138
3	Engine control unit	141
3.1	Removing and installing engine control unit	141
3.2	Adapting components	141
3.3	Reading and erasing engine control unit fault memory	142
26	- Exhaust system	144
1	Removing and installing parts of exhaust system	144
1.1	Assembly overview - exhaust manifold with catalytic converter and add-on parts	144
1.2	Assembly overview - silencers with mountings	147



2	Exhaust gas recirculation system	149
2.1	Assembly overview - exhaust gas recirculation system	149
28	Ignition system	151
1	Repairing ignition system	151
1.1	Assembly overview - ignition system <small>Volksw</small>	151
1.2	Removing and installing ignition coils with output stage	152
1.3	Safety precautions	153
1.4	Test data, spark plugs	153