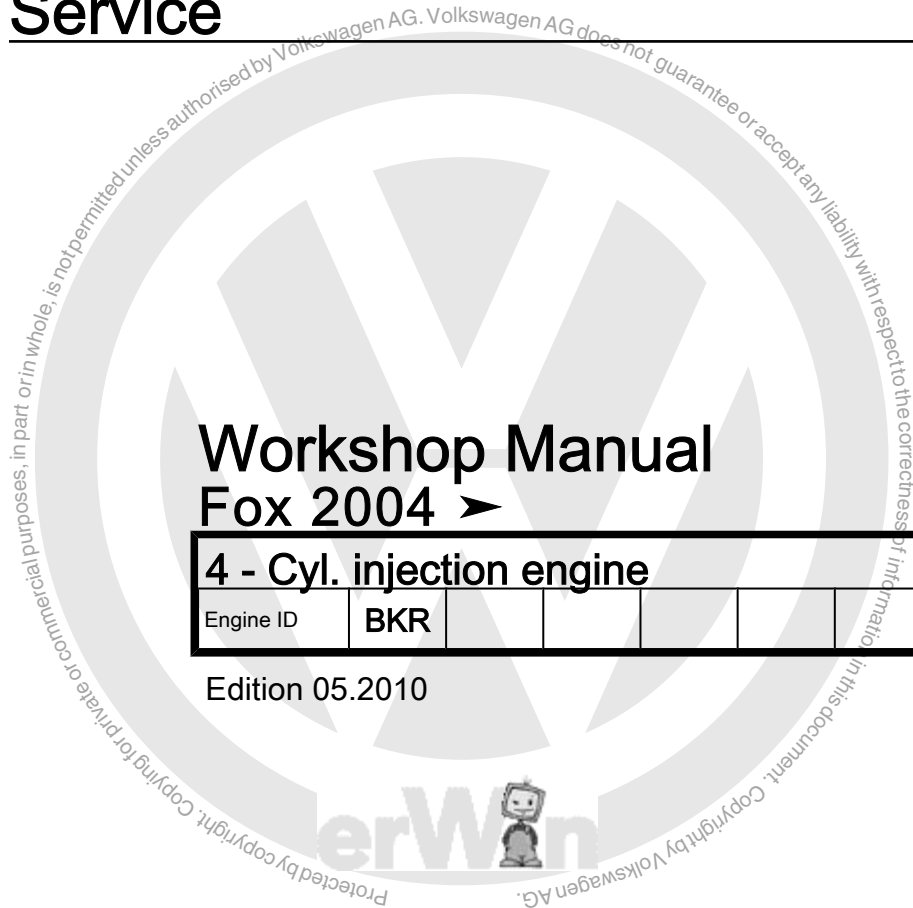




Service



Workshop Manual Fox 2004 ➤

4 - Cyl. injection engine							
Engine ID	BKR						

Edition 05.2010



List of Workshop Manual Repair Groups

Repair Group

- 00 - Technical data
- 10 - Cylinders, engine block, support, protector
- 13 - Crankshaft, pistons
- 15 - Cylinder head, valve control mechanism
- 17 - Lubrication system
- 19 - Cooling system
- 20 - Supply system - Fuel tank, fuel pump
- 24 - Fuel supply system - fuel injection
- 26 - Exhaust system
- 28 - Ignition system

Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

All rights reserved.
No reproduction without prior agreement from publisher.



Contents

00 - Technical data	1
1 Technical data	1
1.1 Engine number	1
1.2 Engine features	1
10 - Cylinders, engine block, support, protector	2
1 Engine - remove and install	2
1.1 Removal - indications	3
1.2 Engine - fasten on assembly stand	6
1.3 Notes regarding installation	6
1.4 Tightening torque	7
1.5 Supports for the power-drive group	8
1.6 Additional notes and installation works in vehicles with air conditioning	9
13 - Crankshaft, pistons	10
1 Engine - disassemble and assemble	10
1.1 Poly-V belt - remove and install	14
2 Crankshaft flanges - remove and install	17
2.1 Crankshaft seal (pulley side) - replace	18
2.2 Crankshaft flange (flywheel side) - replace	21
3 Crankshaft - remove and install	29
3.1 Identifying engine bearing shells	30
3.2 Crankshaft dimensions	30
4 Pistons and connecting rods - remove and install	32
4.1 Piston and cylinder specifications	34
15 - Cylinder head, valve control mechanism	36
1 Cylinder head - disassemble and assemble	36
1.1 Timing belt semi-automatic tensioning pulley - check	38
1.2 Timing belt - remove and install, adjust	41
1.3 Cylinder head - remove and install	46
1.4 Compression - check	51
2 Valve command - repair	53
2.1 Camshaft - check axial clearance	54
2.2 Valve seat - grind	56
2.3 Camshaft seal - replace	58
2.4 Camshaft and cylinder head cover - remove and install	59
2.5 Valve guides - check	62
2.6 Valve stem seal - replace	63
17 - Lubrication system	66
1 Lubrication system components - remove and install	66
1.1 Lubrication system - assembly overview	67
1.2 Oil crankcase - remove and install	69
1.3 Oil pump - remove and install	71
1.4 Oil pressure and Oil pressure switch F1 - check	74
19 - Cooling system	76
1 Cooling system components - remove and install	76
1.1 Cooling system components, body side	77
1.2 Cooling system components, engine side	78
1.3 Cooling system hose connection diagram	81



1.4	Cooling system - drain and replenish	82
1.5	Radiator - remove and install	85
1.6	Water pump - remove and install	87
20	Supply system - Fuel tank, fuel pump	89
1	Fuel supply system components - remove and install	89
1.1	Fuel tank components with accessories and fuel filter - remove and install	90
1.2	Safety measures in fuel supply works	92
1.3	Cleaning rules	92
1.4	Fuel pump (pre-supply pump) G6 - remove and install	93
1.5	Fuel level indicator sensor G - remove and install	94
1.6	Fuel tank - remove and install	95
1.7	Fuel pump (pre-supply pump) G6 - check	98
2	Engine power electronic adjustment (electronic accelerator)	105
2.1	Operation	105
2.2	Engine power electronic adjustment (electronic accelerator) - check	106
3	Activated charcoal filter system	107
3.1	Operation	107
3.2	Activated charcoal filter system components - repair	108
3.3	Fuel tank ventilation - check	108
24	Fuel supply system - fuel injection	110
1	Injection system - repair	110
1.1	General indications related to injection	110
1.2	Component location	110
1.3	Fuel injection components - remove and install	112
1.4	Intake manifold - remove and install	115
1.5	Fuel distributor with injectors - remove and install	116
1.6	Air filter set - disassemble and assemble	116
1.7	Safety measures	118
1.8	Cleaning rules	119
1.9	Technical data	119
2	Component checking	121
2.1	Injection valves - check	121
2.2	Residual pressure and fuel pressure regulator - check	124
3	Engine control unit J623	128
3.1	Engine control unit J623 - remove and install	128
3.2	Adjust components	129
3.3	Check the fault memory in the Engine control unit J623 and erase	129
26	Exhaust system	131
1	Exhaust system components - remove and install	131
1.1	Exhaust manifold, catalytic converter and front exhaust tube with intermediate muffler	132
1.2	Rear muffler with supports	133
28	Ignition system	135
1	Ignition system - repair	135
1.1	General indications about the ignition system	135
1.2	Ignition system components - remove and install	135
1.3	Safety measures	136
1.4	Test data, spark plugs	137



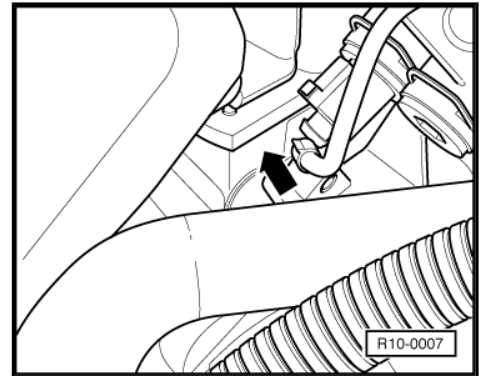
00 – Technical data

1 Technical data

1.1 Engine number

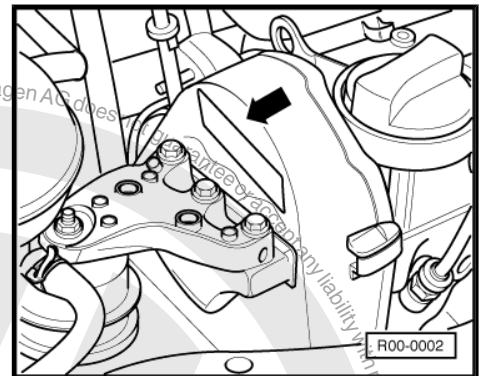
Engine number (“identification letters” and “serial number”) is engraved on the engine block, below the thermostat valve body.

The engine number is comprised of nine digits (alphanumerical) at most. The first part (max. of three identification letters) represents “the engine ID letters”; the second part (six characters) represents the “serial number”. If more than 999,999 engines are manufactured under the same identification letters, the first digit of the 6-digit group is replaced by a letter.



Additionally a sticker is found on the upper cover of the mechanical distribution system -arrow- with the “engine identification letters” and the “serial number”.

The “engine identification letters” are also indicated on the vehicle data plate.



1.2 Engine features

Engine identification letters		BKR
Production		.12.04 ▶
Cylinder volume	cm ³	1390
Power output	kW / rpm	55,0/5000
Torque	Nm / rpm	124,0/2750
Diameter	∅ mm	76,5
Stroke	mm	75,6
Compression rate		10,5:1
Octane rating	at least	¹⁾ 95 lead-free
Injection, ignition		MARELLI 4EV
Knock control		1 knock sensor
Self-diagnosis		yes
Lambda adjustment		2 probes
Catalytic converter		yes

1) in exceptional cases, octane rating of at least 91, but with reduced power output.

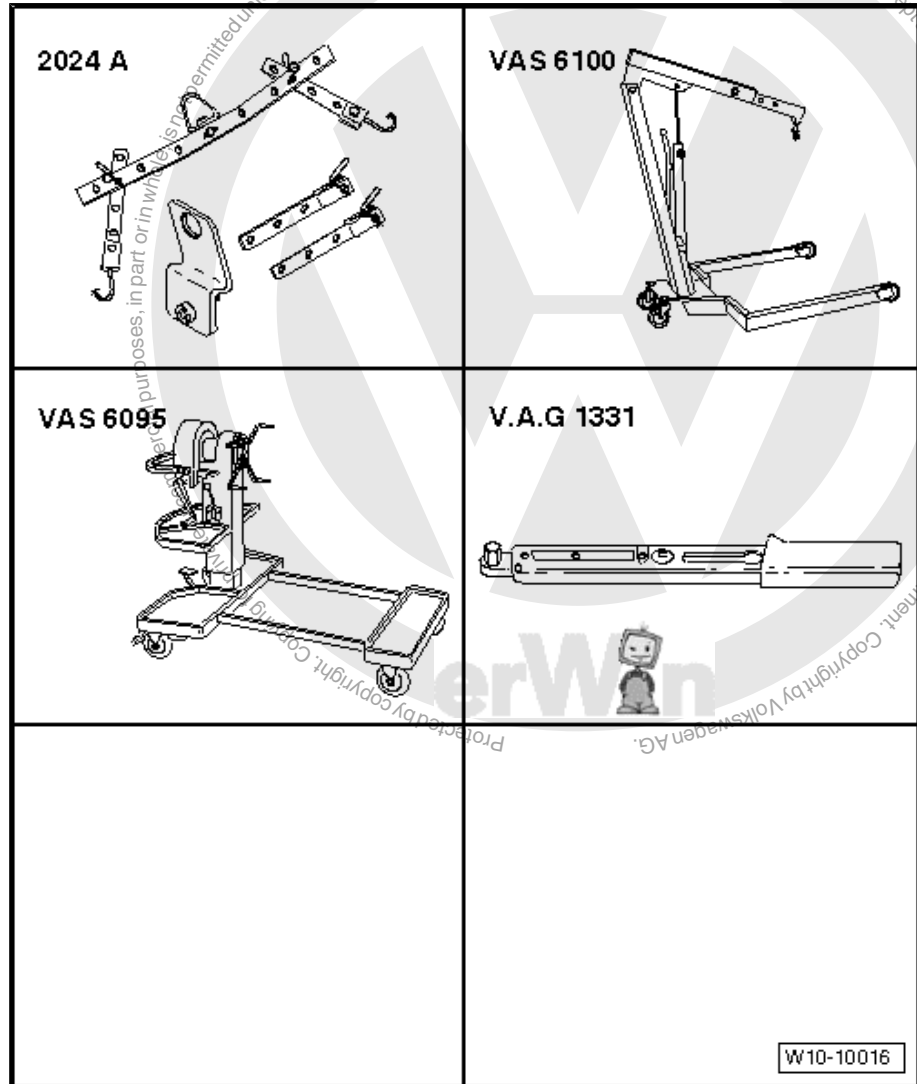


10 – Cylinders, engine block, support, protector

1 Engine - remove and install

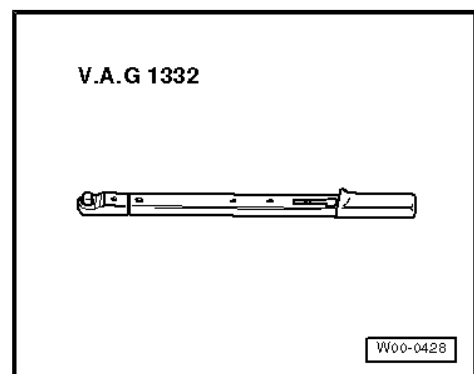
Special tools and workshop equipment required

- ◆ Hanger or 2024A -VW 055-
- ◆ Hydraulic moving hoist - 500Kg or VAS 6100 -EQ 7025-
- ◆ Rotary stand for engine and transmission -VAS 6095-
- ◆ Torque wrench - 5 to 50 Nm (enc. 1/2") -VAG 1331-



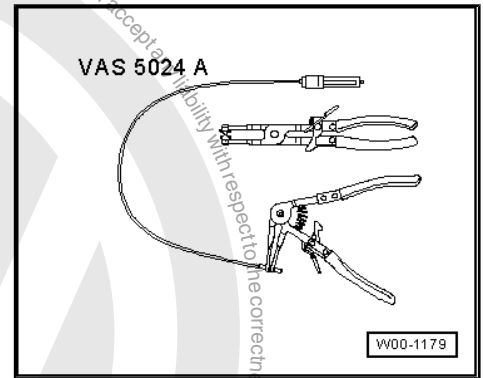
No illustration:

Lifting eyes -030 103 390 F- (on pulley side), -030 103 390 G- (on inertial flywheel side).





- ◆ Torque wrench - 40 to 200 Nm (enc. 1/2") -VAG 1332-
- ◆ VAS 5024A or Standart type clamp pliers -VW 5162-
- ◆ Lubricating grease -G 000 100- (vehicles with mechanical transmission)
- ◆ Cable tie



1.1 Removal - indications



Note

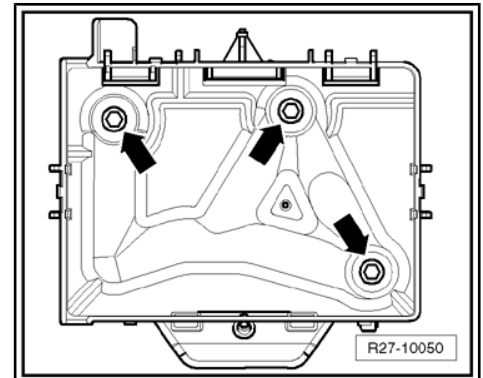
Check whether vehicle has code radio, if so check the anti-theft code before disconnecting the battery earth strap.

- The engine is removed from the front together with the transmission.
- With ignition switched off, disconnect battery earth strap.
- All cable ties that open or break during engine removal should be replaced and installed at the same location when engine is installed.
- Remove air filter cover ⇒ [page 116](#) .
- Remove battery and battery bracket -arrows- ⇒ Electric equipment; Rep. Gr. 27 ; Starter, generator, battery .
- Open and close the coolant reservoir lid to depressurize the cooling system.



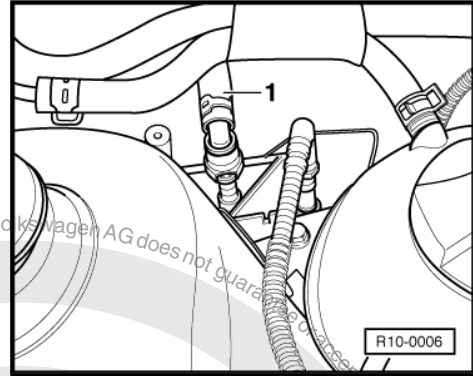
WARNING

Fuel supply hose is under pressure! Before loosening hose junctions, place a cloth around them. Next, eliminate pressure by removing hose carefully.





- Loosen the fuel supply pipes -1- (press the unlock key).
- Loosen the hose of the Magnetic valve for activated charcoal filter -N80- on the intake manifold.
- Close the pipes so as to avoid any dirt from coming into the fuel supply system.
- Follow cleaning rules ⇒ [page 92](#) .
- Disconnect or loosen the following components:
 - ◆ Intake manifold vacuum hose to the servo break.
 - ◆ Connector for the Engine speed sensor -G28- and Intake manifold pressure sensor -G71- with Air intake temperature sensor -G42- .
 - ◆ Connector for the Ignition transformer -N152- , Sensor Hall -G40- and Accelerator butterfly valve control unit -J338- .
 - ◆ Connector for the Coolant temperature sensor -G62- and Oil pressure switch -F1- .
 - ◆ Injection valve connectors.
 - ◆ Lambda probe -G39- connector.
 - ◆ Double connector for the Knock sensor 1 -G61- .
- Remove/disconnect and loosen all transmission electric cables, Generator (Alternator) -C- and Starter -B- .
- Remove/disconnect and loosen all the other necessary engine electric cables.
- Remove vacuum and vent hoses from the engine.
- Remove lower noise insulation from engine: ⇒ Body – Repair ; Rep. Gr. 50 ; Body - Front part .
- Loosen exhaust tube from the exhaust manifold
⇒ [page 132](#) .





- Loosen pendulum support -arrows-.
- Loosen transmission gearshift mechanism: ⇒ Automatic/mechanical transmission; Rep. Gr. 34 ; Drive, housing .
- Loosen hydraulic clutch actuator cylinder: ⇒ Automatic/mechanical transmission; Rep. Gr. 30 ; Clutch - control system .

**Note**

Clutch pedal must not be pressed.

- Drain the cooling system ⇒ [page 82](#) .
- Remove the engine cooling system hoses with the VAS 5024A or Standart type clamp pliers -VW 5162- .

Vehicles with air conditioning

- Remove Poly-V belt ⇒ [page 14](#) .
- Loosen air conditioning compressor: ⇒ Aeration system; Rep. Gr. 87 ; Air conditioning .
- Observe additional notes and installation work ⇒ [page 9](#) .

Continued for all vehicles

- Remove the power steering oil pump and put it aside, together with the local hoses ⇒ Chassis; Rep. Gr. 48 ; Steering .
- Loosen right and left drive shafts in the transmission and secure them on top : ⇒ Chassis; Rep. Gr. 40 ; Front suspension .
- Remove front panel and its components, supporting them ⇒ General body repairs, exterior; Rep. Gr. 50 ; Body - Front part .
- Loosen cooling system pipes from the engine cylinder head.
- Install lifting eyes in place of the cylinder head coolant pipes. Tightening torque: 25 Nm.
- Attach with the Lifting tackle -2024A- as follows and lift a little with the hoist:

Belt pulley side: Drilled horizontal bar holes in -position 1-.

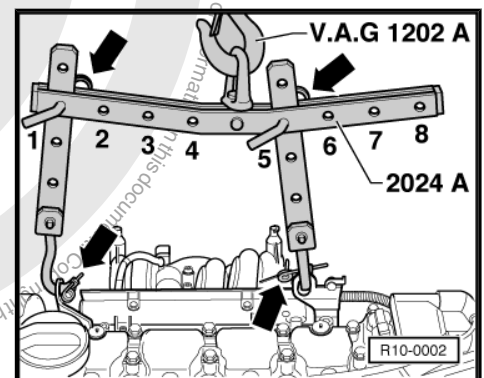
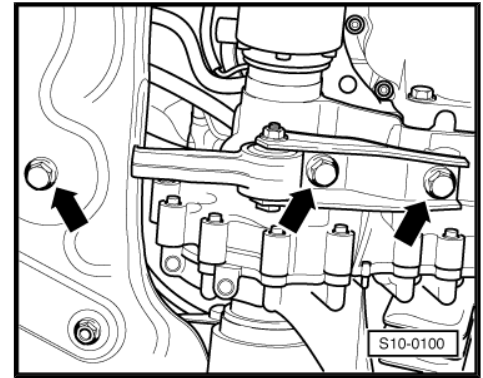
Engine flywheel side: Drilled horizontal bar hole in -position 5-.

**WARNING**

On hooks and pins, use safety locks -arrows-.

**Note**

- ◆ *Positions numbered -1...4- on suspension bar face toward the pulley.*
- ◆ *Drilled holes on supports are counted from the hook.*





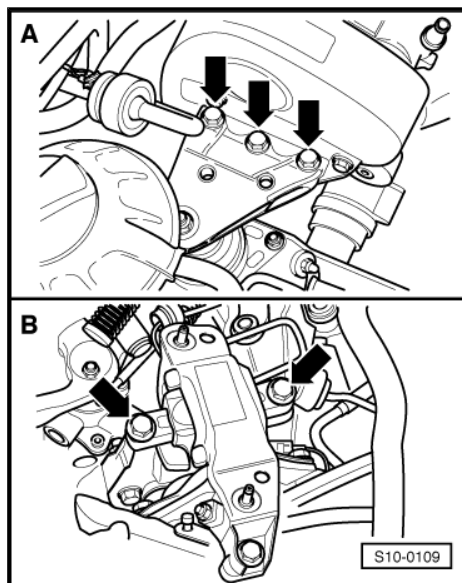
Fox 2004 >
4 - Cyl. injection engine - Edition 05.2010

- Loosen the assembly on transmission support -B- and on engine support -A- -arrows-.
- Lower assembly until it comes out of the transmission housing.
- Remove the assembly from the front. In this case, the assembly must be quickly turned and lowered, if necessary.



Note

The assembly must be carefully carried when removed, so as to avoid damages to the body.

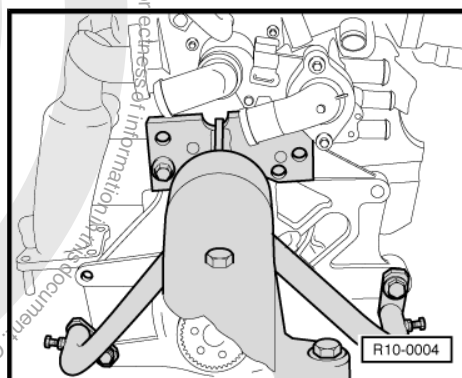


1.2 Engine - fasten on assembly stand

To perform the assembly work, the Support -VW 540- must be fastened on the Assembly stand support -VW 313- or Rotary stand for engine and transmission -VAS 6095- .

Operation sequence

- Remove transmission flange.
- Remove thrust plate.
- Remove flywheel.
- Remove intermediate plate.
- Fasten the engine with the Support -VW 540- on the Support -VW 313- or Rotary stand for engine and transmission -VAS 6095- .



1.3 Notes regarding installation

Installation is carried out by reversing the removal sequence, considering the following:



WARNING

For installation jobs, especially in the engine compartment, due to reduced existing space, consider the following:

- ◆ *All hoses (fuel, hydraulics, activated charcoal filter system, cooling fluid and gas, brake fluid, vacuum) and electric cables must be restored to original positions.*
- ◆ *Provide easy access to all the moving or hot parts.*