

Quantum Mechanics

When we started talking about this article around the office, the choice for a title seemed pretty obvious. If it's going to be an article about Volkswagen Quantum maintenance tips, why not call the article "Quantum Mechanics?" While its certainly not the most original idea we've ever come up with, it still provoked a few chuckles and we decided to go with it.

Unless you've spent a lot of time in a Physics lab, your understanding of the real field of quantum mechanics probably isn't a whole lot better than mine. A quick trip to the dictionary told me that the term "quantum mechanics" refers to a theory of the structure and behavior of atoms and molecules. This is the heavy duty stuff that Albert Einstein was grappling with long before most of us were born.

But why would Volkswagen name a car after an

atomic theory? It's more likely they were alluding to a "quantum leap," another term that gets tossed around without really understanding what it means. One possible meaning of this term (consulting the dictionary again) is an abrupt change or step in knowledge or information.

I think this is the meaning of the word that the product planners at Volkswagen had in mind back in 1982 when the Quantum was introduced. To be honest, it really wasn't a very abrupt change, since the Quantum was built on the experience that Volkswagen gained while producing the Dasher. If you take a Dasher, add several inches to the front, back, and sides, you've got a Quantum. That may be oversimplifying things a great deal, but you get the idea.

The Quantum's "great leap forward" only lasted

from 1982 to 1988. During that period as Volkswagen's largest sedan, the Quantum went through several different engine options. The standard engine on early Quantums was a 1.7 or 1.8 liter four cylinder engine. Until America's love affair with the diesel engine ended in the mid-80s, you could also get a Quantum with a 1.6 liter turbo diesel.

Beginning in 1983, the 2.2 liter five cylinder borrowed from Volkswagen's Audi division was also available as an option. Toward the end of its life span this became the standard powerplant. A four wheel drive (Synchro) model was also introduced in 1986.

There's nothing too unusual about the four cylinder and diesel models, since these same engines can be found on other Volkswagen models of the same era. Most of the information in this article will pertain to Quantums equipped with the five cylinder engine and the KE-Jetronic fuel system.

Tools For Quantum Mechanics

Albert's favorite tool for tackling difficult problems in Quantum Mechanics was the space between his ears. You'll need to use this area of your head too, but a few well-chosen hand tools might make the job a little easier as well.

Volkswagen was one of the earliest U.S. imports, so special tools and equipment are readily available for all models. The following tool suppliers offer a range of Volkswagen (and other) tools and can supply you with the Quantum Mechanic's tools you may need.

Assemmacher Tools; Circle No. 141

Baum Tools; Circle No. 142

Schley Products; Circle No. 143

Zelenda Machine and Tools; Circle No. 144

— By Karl Seyfert



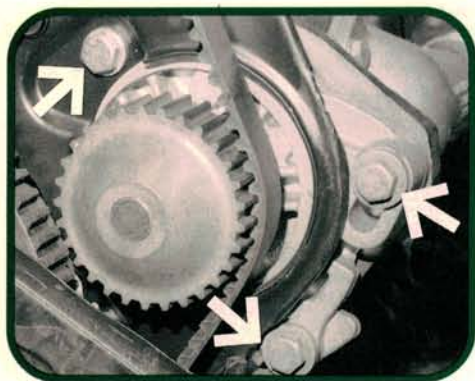
1

Broken exhaust manifold studs and leaking exhaust manifold gaskets are common on five cylinder engines. Expansion and contraction of the cast iron exhaust manifold may cause stud breakage at the number 1 and 5 exhaust ports. We saw this broken number 5 stud through an opening in the wheel well.



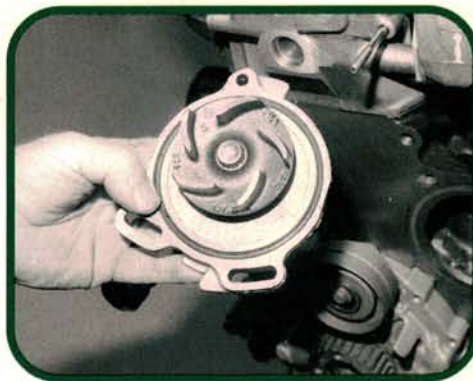
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Specially tempered studs are available to replace broken exhaust studs. Always check the manifold mounting surfaces for flatness when replacing broken studs. The manifold can be machined and need not be replaced if it becomes slightly warped. Replace the self-locking manifold nuts, too.



3

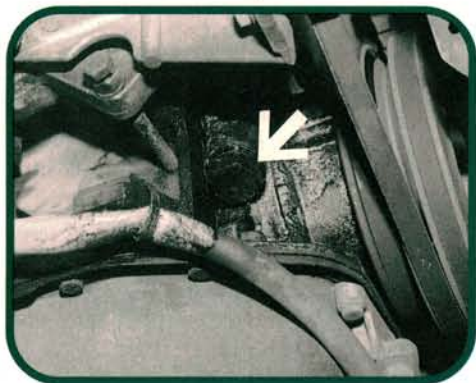
On five cylinder engines, timing belt tension is adjusted by pivoting the water pump. Whether you're installing a new belt or adjusting the tension on an old belt, always replace the water pump o-ring before moving the water pump. Used o-rings often will leak after the water pump has been moved.



4

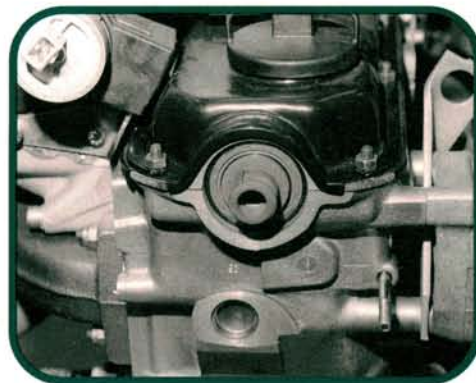
The sealing groove on some remanufactured water pumps has been resurfaced and enlarged. These pumps can be identified by the number 5 stamped on the fastening flange area. The 4 mm o-ring will not seal when used with these pumps. An oversized 5 mm o-ring (part number 069 121 043) must be installed.

Quantum Mechanics



5

This engine is leaking from somewhere, but it's anybody's guess where the oil is coming from. Remove the timing belt cover for a better look. Likely candidates are the crankshaft seal, camshaft seal, or oil pump pressure relief valve (arrow). A leak like this will quickly ruin a timing belt.



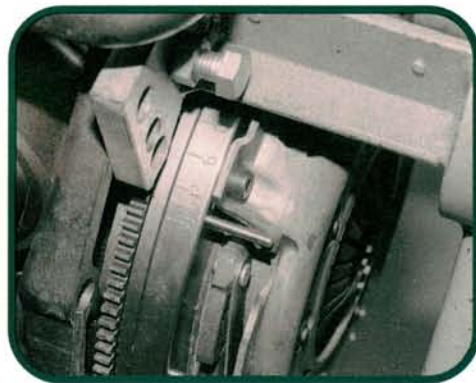
6

The cam and crankshaft both take the same size seal. The camshaft seal can be replaced without removing the valve cover or bearing cap, if you have the VW/Audi special tool or are handy with a hook-style seal puller. If not, remove the valve cover and front cam bearing cap.



7

Cam timing marks are on the back side of the cam sprocket on four and five cylinder models. Line up the mark with the top edge of the cylinder head. An access window in the belt shield on five cylinders allows a glimpse of the timing mark with the timing belt shield installed.



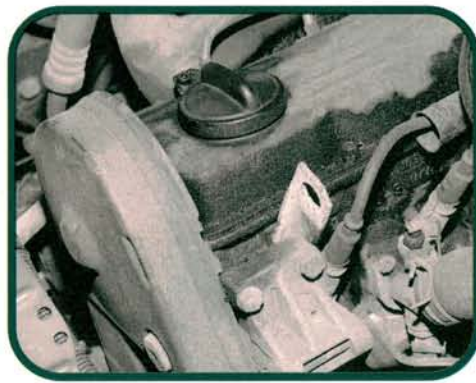
8

The crankshaft timing marks are on the flywheel. This engine is on a stand, so we can't show you the timing window in the top of the transaxle bell housing. Normally, you would line up the zero mark on the flywheel with the notch in the timing window before installing the timing belt.



9

The large crankshaft pulley on four cylinder models puts a lot of strain on the end of the crankshaft. The constant pounding from the compressor may loosen the crankshaft bolt on engines equipped with A/C. If the pulley gets loose enough to wobble, it can quickly destroy the crankshaft snout.



10

Valve cover gasket materials have been changed to combat oil leaks. The results have been only partially successful. Valve cover leaks are still common, and usually develop as the gasket hardens and compresses. A dab of RTV at the corners when a new gasket is installed will postpone the inevitable.



11

Five cylinder engines need a little extra help from a gear-driven auxiliary vacuum pump to produce enough vacuum for the brake booster and vacuum-operated engine controls. If the braking system loses power assist, the most likely cause is a broken vacuum pump diaphragm.



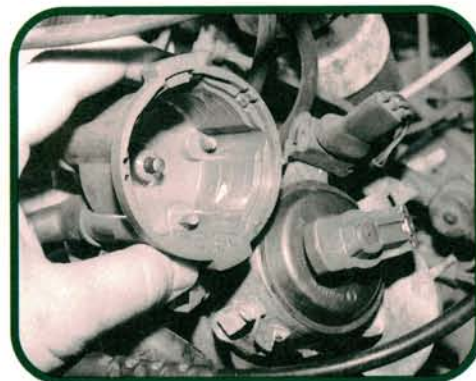
12

The cooling system pressure cap is mounted in the overflow bottle, not the radiator. Cracked and leaking overflow bottles are a common occurrence on Quantum, as well as other Volkswagen models. The bottle usually leaks when pressure expands the bottle. Break out your pressure tester to find the crack.



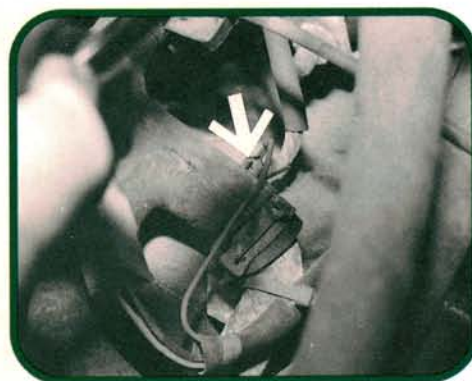
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The ignition wire connectors have been changed on later five cylinder engines. Pull the smaller connectors straight out of the cap tower to prevent damage to the cap. Loosening and peeling back the ignition cable boot will make removal easier. These components are not interchangeable with earlier designs.



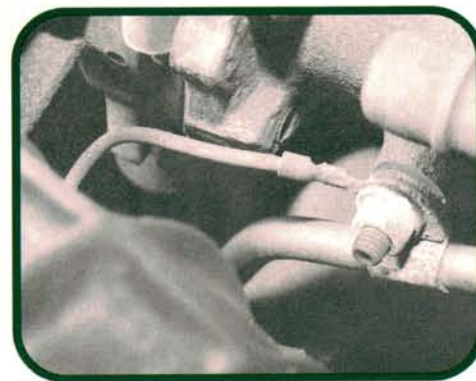
14

Inline resistors are used at the spark plug for radio noise suppression. This increases the secondary resistance to high levels. Any additional resistance at the cap, rotor, or spark plugs may be more than the coil can overcome. Rough running or intermittent misfires may result if the spark takes a detour.



15

Corrosion at the main battery ground cable on the transaxle can cause starting problems. Remove the ground cable from the battery, then from its mounting point on the transaxle. Clean the eyelet and mating surface, then coat the area with lithium grease. Reinstall the cable and torque to specifications.



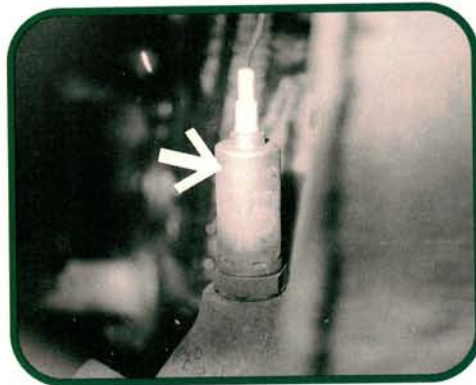
16

Several important fuel system ground wires are attached to this nearly hidden bolt on the side of the intake manifold. Loose, corroded, or broken wires here can give you some odd driveability problems. Uneven idle speeds may be caused by a poor ground to the idle stabilizer valve.



17

Grease on the ECU terminals may affect the oxygen sensor signal and cause a lean condition on five cylinders. Unplug the sensor, then check circuit bias voltage (ignition on). If it's more than 0.55 volts at the sensor's harness connector, disconnect the ECU harness and clean the terminals with rubbing alcohol.



18

Writing about the oxygen sensor is much easier than actually seeing it. Volkswagen recommends sensor replacement at specified intervals. A light on the dash alerts the owner. Reset the mileage counter (mounted on the speed cable near the ECU) then remove the oxygen sensor through the wheel well.



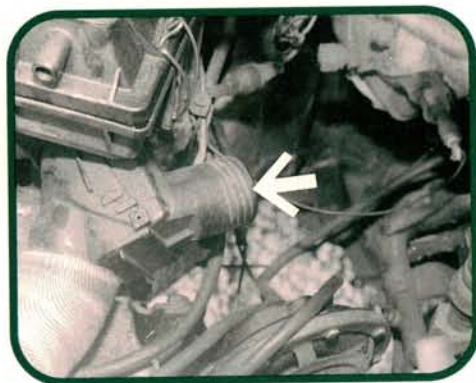
19

Starting or hesitation problems may occur after replacing the fuel filter. Many replacement filters have a recess on the inlet boss which may allow the original banjo bolt to bottom, restricting fuel flow. The correct bolt length to be used with the recessed filter is 25 mm (P/N N 021 0741).



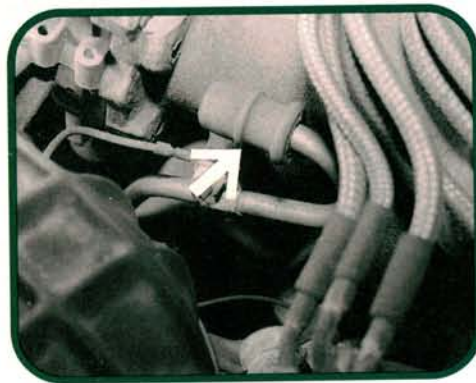
20

An idle stabilizer valve is used on five cylinder engines equipped with the KE fuel system. Engine heat may damage the valve's connecting hoses, causing false air leaks. Early valves also caused idle speed problems. A green or yellow dot on the valve indicates that it is the later, improved design.



21

The condition and operation of the intake air preheat hose and thermostatic control door is very important on both K and KE fuel systems. If the hose is disconnected or broken, or if the door is stuck in the unheated outside air position, the air flow sensor will ice up during cold and damp weather.



22

Volkswagen emission levels should be measured before the catalytic converter. A special test port connected to the exhaust manifold is provided for this purpose. When hooking up your emissions analyzer, be sure to use the recommended hose type. The wrong hose may melt and damage your analyzer.



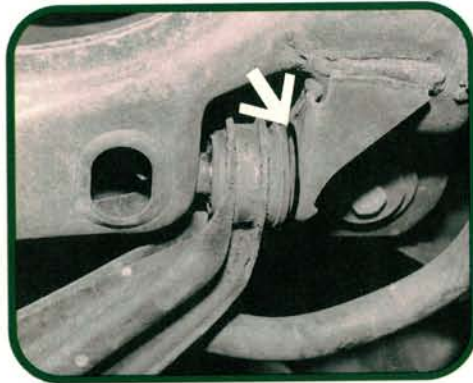
23

Loose catalytic converter ceramic inserts may cause exhaust rattles. Make sure the rattle isn't a loose heat shield or mounting flange, then remove the converter for a visual inspection. If the converter looks good, tap both flanges on a wood block from a distance of eight inches to check for rattles.



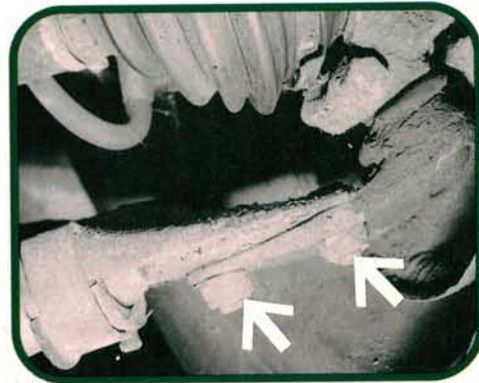
24

Cracked or leaking cruise control vacuum hoses may cause engine vacuum leaks and/or erratic cruise control operation. Volkswagen came out with an improved vacuum hose (P/N N 018 046 3) that should be used to replace any cruise control vacuum hose that has been damaged by heat.



25

Front control arm bushing wear is a problem that is more commonly seen on manual transmission models. Worn bushings will cause a clunk as the engine is accelerated or decelerated. Rub marks on the frame indicate that these bushings have allowed the control arms to move forward and backward.



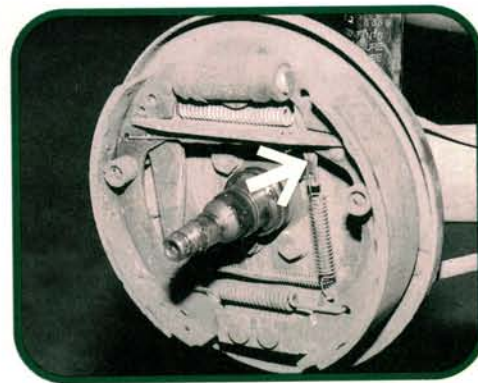
26

Unlike its Golf and Jetta brethren, the camber on the Quantum is adjusted by loosening the bolts, then moving the ball joint in or out on the lower control arm. If you don't have the special lever tool to slide the ball joint while the tire is resting on the ground, lift the wheel off the ground first.



27

Front brakes are pretty standard-issue Volkswagen. Brake parts have come from several different suppliers over the years. The rotors are not "captive," and can be easily removed after removing the caliper and caliper mounting frame. These non-ventilated rotors don't take well to much resurfacing.



28

A ridge on the lip of the brake drum may make it difficult to slide the drum past the brake pads. A sliding wedge holds the rear brake self-adjustment. You should remove the wheel, then reach through an axle bolt hole to press this lever (arrow) and release the self-adjuster mechanism.