

Mid America Motorworks Air-Cooled VW Engine Technical Tips

AIR-COOLED VW ENGINE INSTALLATION TECHNICAL TIPS

Helpful Hints on Removing & Installing
Air-Cooled VW Engines:

**Before doing any work on your VW.
Make sure the battery is disconnected.**

Check the condition of the engine surround seal, **355406**, **355408** or **301185** as these are VERY important in keeping hot air from the heat exchangers and muffler out of the engine bay.

1. To simplify reconnection of the wires and plugs, attach identifying tags to each as you disconnect them.
2. When under the vehicle, pull off the fuel hose and plug it quickly to avoid gas spillage and fire hazards. Or you can clamp the flexible fuel hose with vice grips. Do not smoke or work near heaters or other fire hazards. Have a fire extinguisher handy.
3. Check the clutch release bearing for wear. Replace it if needed. Roughen the plastic facing with an emery cloth and rub in molybdenum disulfide grease.
4. Make certain that the crankcase is filled with oil as far as the top mark on the dipstick. Do NOT overfill. A stock Bug engine holds only 4 1/2 pints.
5. When installing the engine, put the transmission in gear, set the parking brake, then hand-turn the crankshaft or one rear wheel until the splines mesh. (Careful not to damage the transmission rear driveshaft or the clutch driven plate.)
6. If you lose the half moon head bolt above the starter motor we do keep these under 319343.

**1600cc Turnkey Engine, Single Port
Single Carburetor. Item #319-277**





Oil Pump / Filter Conversion with Gasket. Item #306-140



VOLKSWAGEN ENGINE OIL PUMP TECHNICAL TIPS

Use an oil pump puller to remove the housing from the **Volkswagen Engine Crankcase!** This tool will allow the oil pump can be removed without draining the oil or separating the crankcase halves. Be sure to thoroughly clean the outside area around the pump. This will help you be careful not to let dirt enter the engine while the pump is out. A different puller claw must be used for the larger pump introduced on 1971 engines. The late-type single-carburetor engine oil pump, which has 23mm (1024 inch) gears, must be used with the four-rivet camshaft; the early-type pump, which has 21mm (.827 inch) gears, must be used with the three-rivet camshaft. If the parts are mixed, the oil pump will neither fit nor supply lubrication.

VW COOLING SYSTEM TECHNICAL TIP

The **cooling system** designed and engineered by **VW** is a very efficient one. The engine, however, was improved upon throughout the production years of the automobile.

As changes to the engine were implemented, such as increases to compression and horsepower, the design of the cooling system was modified to compensate for the resultant increase in heat.

When rebuilding a **VW engine**, it is very important to keep the compression ratio within the limits originally set forth by the factory (or lower) and to use the most recent design of cooling system for both oil and cylinders. Not that the older original cooling systems didn't work, it is just a known fact that the newer designs work a little better.

The cooling tin painted flat black for maximum efficiency, covers most of the needs of the restorer and hobbyist looking to replace or upgrade the cooling system on their VW engine. An important thing to remember is to use the cooling tin as it was designed – all of the pieces working together for a specific application.

VOLKSWAGEN ENGINE BEARING SIZE TECHNICAL TIP

Volkswagen Engine Bearing sizing is an issue that can be confusing. Mid America Motorworks gives you a Crank size, a Case size and a Thrust size and then factors in almost every conceivable combination of the three. If you are building an engine where the case, crank and rods are new or check out to be standard size, it is real easy to buy the bearings needed—just look for the standard size in all three categories.

Engine Main Bearings.80 Case. Item #316-004



However, most of you are working with a re-manufactured case, a re-manufactured crank and re-manufactured rods. In other words, most likely, all of your pieces for the short block assembly needed machine work. Therefore, your machinist will be able to inform you as to the measurements from standard that were necessary to machine from your components. On the crank, he will give you a measurement that will be under standard; same for the rods. On the case side of the main bearings, he will give you a measurement that is over standard, a result of line boring your case if it was necessary.

What about the Thrust size? This measurement from standard applies only to the front main bearing (the largest one in the box). On the outside circumference of the bearing there is a large groove that runs the full width. This is where the bearing fits on the case halves. This area of the car is subject to side loading (Thrust) and sometimes is damaged. If your case needs machine work here the under standard size is what your machinist will tell you to obtain in a main bearing size.

THE IMPORTANCE OF PROPER AIR COOLED VW BELT TENSION

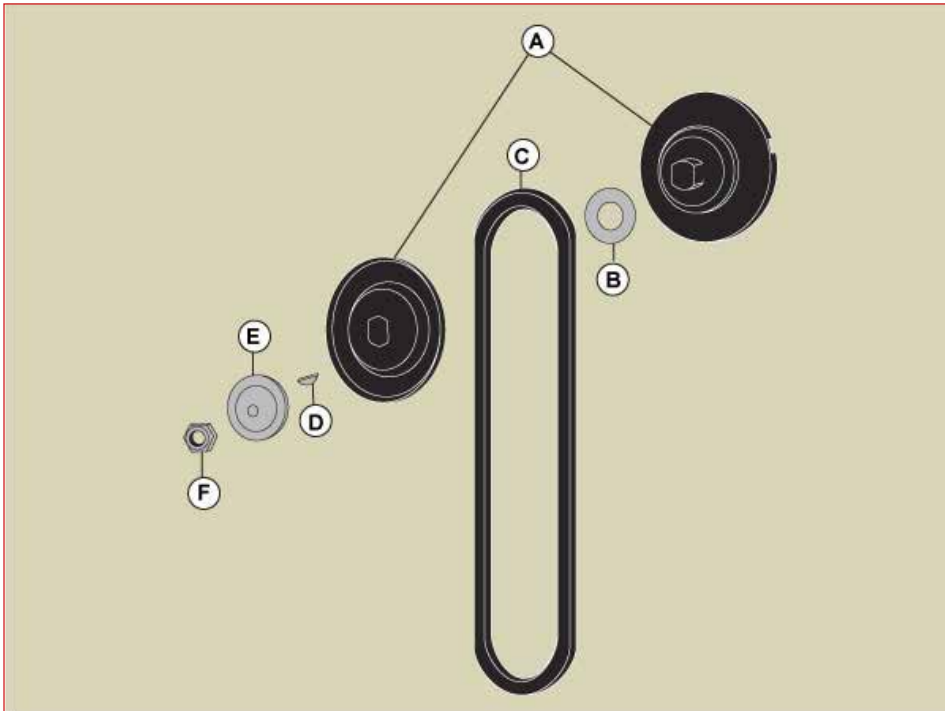
Taking care of your Air Cooled VW's Engine lifeline.

Many drivers new to classic air-cooled VW engines are not aware that the crankshaft drives the fan belt which in turn drives not only the



Fan Shroud, Paintable Without Heater Ducts. Item #300-459





generator or alternator, but also the cooling fan. As a result it is common for people to keep driving when the generator light appears because the engine still runs. Because the fan belt is broken the fan no longer turns, so the engine overheats and seizes, usually within a couple of miles.

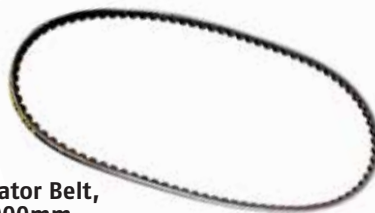
I ALWAYS carry a spare fan belt, no matter how recently the belt was changed.

The SKUs for the belts are **355085**, **300543** and **355086**

Oil and air are the primary cooling means for you **VW Bug's Engine**. When it comes to providing air to the cylinders, the generator/alternator and cooling system are driven by the fan belt. Due to the power absorbed by these two units, the fan belt is subjected to considerable stress, especially at high speed and when shifting down. It is of utmost importance to maintain the belt at the correct tension, if the belt is too slack, it will slip and lead to an overheating of the engine. Excessive tension creates undue stress and is liable to cause breakage of the belt and damage to the pulley or alternator/ generator bearings. While you are checking this, also look for frayed ends or cracks in the belt and replace if necessary.



Generator Belt,
9.5 x 905mm.
Item #355-085



Generator Belt,
10 x 900mm,
6 Volt Generator.
Item #300-543



Alternator Belt,
11.3 x 912mm.
Item #355-086

You should feel the belt also to check the surface for nicks or other evident damage or wear not detectable with a visual inspection. Visually check the alignment of the pulleys and correct any misalignment via shims or spacers. Some belt failures can be a direct result of oil contamination due to

excessive blow-by of a worn engine or road debris if your car is missing the pulley tin.

It is recommended to check your V-Belt at least every 5000 miles. To test the belt for proper tension, press firmly on the belt with your thumb and measure this distance. The belt must yield approximately 15mm or .6 inches. It is best to crank the engine over a few revolutions or start it momentarily before checking the tension anytime you have made changes to the pulley shims. Doing this will make sure the belt is seated properly in the V-groove rather than possibly being pinched during installation. Also check your belt tension again after the first 100 miles whenever a new belt has been installed.



Distributor,
Centrifugal Advance,
009 with O-Ring.
Item #108-041

AIR-COOLED VOLKSWAGEN IGNITION DISTRIBUTOR TECHNICAL TIP

Due to the interchangeability of **VW Distributors** throughout the entire 37 year VW range, for ordering purposes we must rely on the distributor number and not the year of the car. Years are listed as a reference point only. The ten digit number is often on the back of the distributor and can only be read by removing the distributor from the engine. **MAM**