



Part 2 in a 2 Part Series

This tech tip is designed to assist you when installing a rebuilt or replacement engine in your air cooled VW. If your engine was removed recently installation is the reverse procedure of removal. However, these tips may help you to avoid common time consuming pitfalls particularly if your engine has been out for many months or even years.

Materials Needed

- Small trolley jack.
- Four jack stands with supports to give a total rise of 30 inches.
- Jack pedestal consisting of six 3" independent layers; top 15" x 24".
- One piece of 3/4" plywood, 15" x 24."
- Wheels, blocks, boards, bricks, etc. to make two engine pedestals, 24" high.



Engine Installation

Installation of the engine is essentially the reverse of the removal, with the following tips:

- Take your time getting the engine back in! Care and patience are lots more important than muscle!
- If you can avoid it, don't rotate the engine or gearbox while the engine is out of the car. This will assure that the gearbox drive shaft will line up with the splines and pinion bearing (in the center of the flywheel) when it goes back in.

Note: If you are changing the clutch or the flywheel main seal, relative movement of these joining parts will be unavoidable--this will just mean careful alignment of the clutch plate with the pinion bearing, and extra shoving to get them to go back together.

General Engine Reinstallation Steps

- Wipe off the mating surfaces of the engine and transmission. Lightly lubricate the manual transmission rear drive shaft splines with molybdenum disulfide powder or grease. On engines equipped with Bosch starters, lubricate the starter drive bushing in the transmission case with multipurpose grease.
- Position the engine under the rear of the car.
- Carefully raise the engine. Hold the engine with your hand on the top of the fan housing to keep it from flopping around.

Note: Take care to assure that the vacuum canister on the distributor, the generator/alternator pulley, and the corners of the engine tin clear the rear apron and the engine surround rubber seals. The front and rear engine rubber seals are very important items because they keep the hot air around the heat exchangers and exhaust out of the engine bay. This is very important on an air-cooled engine.

- Position the two bottom studs in the engine in the holes at the bottom of the bell housing. Continue to slowly raise the engine until it is level (on the same plane as the transaxle). Look carefully at the jack height to make sure that the engine is "lined up" with the gearbox shaft.

Note: In some cases the top studs are first to be positioned. Once aligned, the engine can be lowered to be level with the transmission.

- Engage first gear, set the parking brake, then hand-turn the crankshaft until the splines mesh.
- Push and wiggle, push and wiggle -- turn the crankshaft a bit if necessary. It may resist a little at first, then "pop" into place.

Note: It's easy enough to get the bottom two studs roughly into position in the bell housing, but then it takes some real shoving to push the engine forward. Make sure that the engine, the car and the transaxle are level.

Note: Before pushing the engine all the way in, make sure the alternator and backup light wires are routed out of the way. Also make sure the throttle cable is routed properly through the firewall.

Note: You may find it useful to put your feet on the back of the engine case (just in front of the muffler) and push forward while pulling back on the bumper with your hands. You can get some good leverage that way. It also helps to look carefully at the jack height so you get the engine "lined up" with the gearbox shaft before the final push. Check that the gap around the bell housing is the same top and bottom.

- If the rubber engine seal between the engine tin and the body is intact, check to make sure that it is aligned properly and securely positioned within the groove provided for it around the perimeter of the engine compartment.

Note: This is VERY difficult to do, but it is very important that this seal be in place to prevent dirty road air from being sucked into the engine compartment.

With the engine still supported by the jack, replace the four nuts that connect the engine to the transaxle. Each of these connections is different; they are described as follows -

- Upper right: This is a free bolt which also serves as the starter motor upper bolt. Push it through the starter motor flange and the bell housing. The end will protrude into the engine bay, in front of the fan shroud on the right-hand side. Attach a washer and nut to the end of the bolt and tighten with a 17mm wrench.

Note: Sometimes an 18mm wrench is needed along with the 17mm for the engine bolts.

- Upper left: This bolt is located just inboard of the clutch lever at the top of the transaxle. The nut in the engine bay is captive; the bolt must be removed from the front. Turn the bolt into the captive nut then tighten with a 17mm socket on a 1/2-inch ratchet with a 6-inch extension. Approach the bolt with the long extension above the clutch cable. A good light in this area is a great help.

- Lower right and left: These two connection points are studs in the engine block. The studs protrude through the bell housing near the ends of the rear transmission bracket on the lower side of the transaxle. Place a washer and nut on each stud and tighten with a 17mm box-end wrench.

- Torque all four mounting fasteners to 22 ft-lb.
- Run the fuel line forward through the grommet in the firewall tin on the left side. Attach the fuel line to the fuel pump.

- Make sure that the accelerator cable guide tube is properly positioned through the fan housing and the hole in the top of the firewall tin. Run the accelerator cable into the guide tube and attach it to the carburetor.

- Attach the heater cables to the lever arm assemblies on the heater boxes.

- Attach the flexible couplings to the heater boxes and secure with hose clamps on both ends.

- Reconnect the wire harness in the engine bay -

- Black wire from the ignition switch to the (+) terminal on the coil;
- Black wires from the (+) terminal on the coil idle to the idle cut-off switch, automatic choke, and backup (reversing) lights;
- Separate wire from the "oil" light in the instrument cluster to the oil pressure switch.

- Reconnect the generator/alternator wires -

- Heavy red wire from the B+ terminal on the alternator through the firewall to the battery;
- Green wire from the D+ terminal on the alternator to be spliced with the blue wire that runs forward to the "Alt" light in the instrument cluster.

Reinstall the fresh air hoses.

Reinstall the air cleaner and the crankcase breather tube.

Reconnect the grounding strap on the battery.

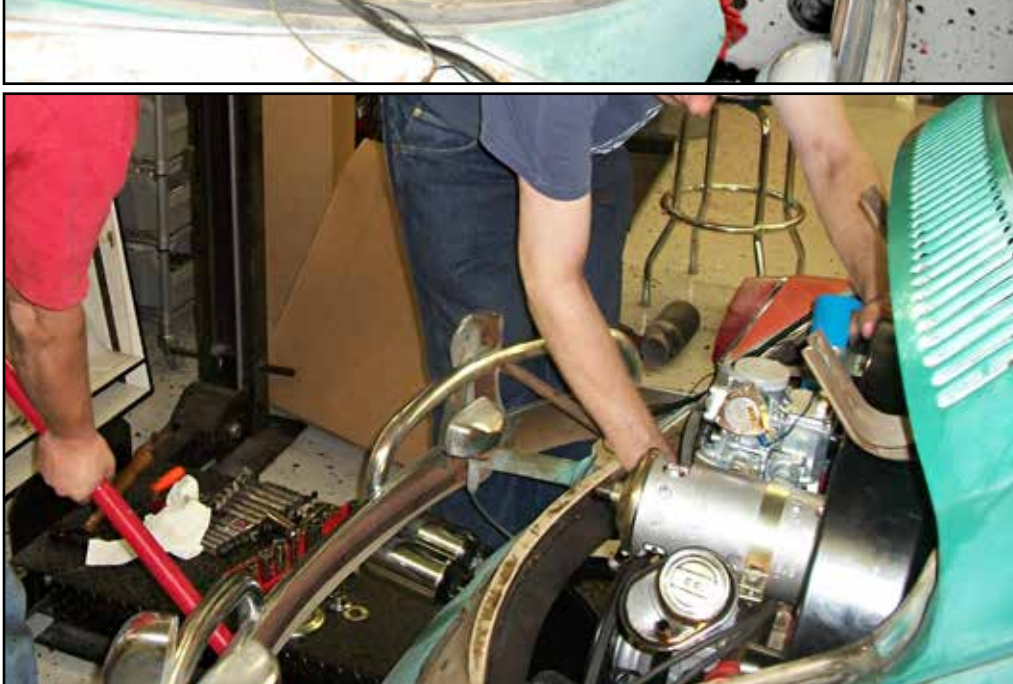
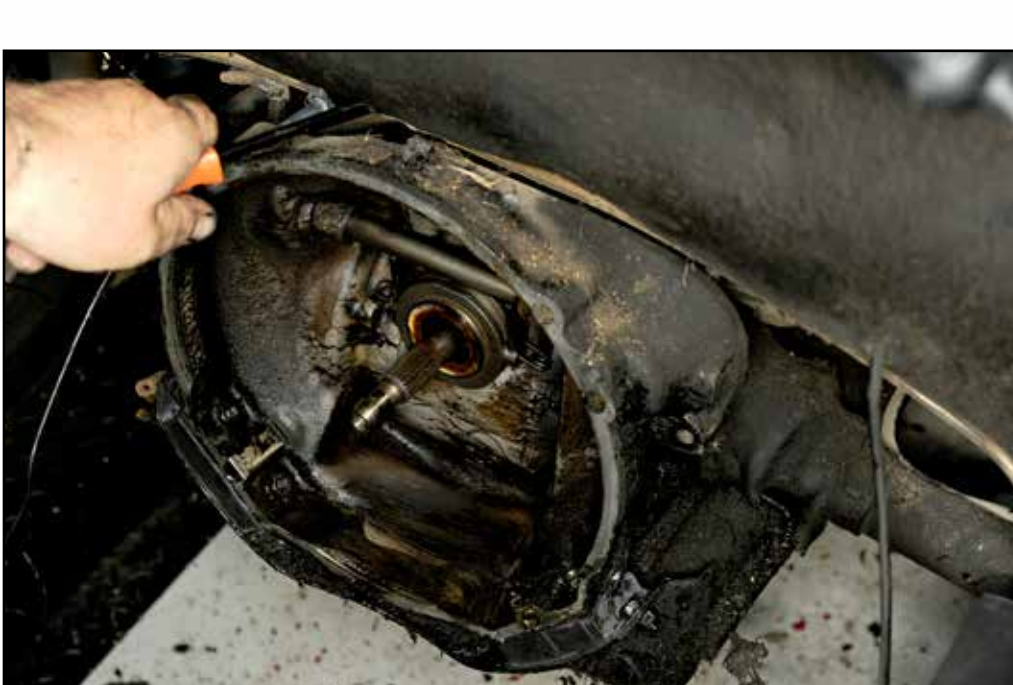
Adjust the clutch.

Add engine oil. If necessary.

Lower the car.

Tune the engine.

Start & Enjoy!



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