

CYL-01, Cylinder Head and Head Gasket Removal (8V Cars)

Tools

- Jack Stands or Ramps
- 6 mm Allen Head Socket or 6 mm Hex key
- Metric Socket Set
- Metric Wrench Set
- Flywheel Lock (P9206) (optional)
- Pry bar
- Flat tip screwdriver

Other Procedures Needed

- [ENG-13](#), Locating and Setting Engine to Top Dead Center (TDC), Cylinder 1
- [FUEL-02](#), Fuel Injector and Fuel Rail Removal and Installation
- [CAM-01](#), Camshaft Assembly Removal
- [FUEL-09](#), Intake Manifold Removal and Installation
- [COOL-02](#), Coolant System Draining, Filling, and Venting

Procedure

1. Place car on jack stands or ramps.
2. Using [ENG-13](#), set the engine to TDC.
3. Using [FUEL-02](#), remove the fuel rail and fuel injectors.
4. Using [FUEL-09](#), remove the intake manifold.
5. Using [CAM-01](#), remove the camshaft assembly.
6. Using [COOL-02](#), drain the cooling system.

NOTE (from Tim Richards)

I've never tried it personally but, Tim Richards suggests removing the cylinder head with the exhaust manifolds still attached. According to Tim, it saves a couple hours of work. The cylinder head can also be installed with the exhaust manifolds attached. Thanks for the suggestion Tim.

Recently, a Garage Shop Manual user reported that he was unable to remove the head using Tim's method described above. So, if you decide to try it and it doesn't work, don't be surprised.

Also, in talking to a Porsche mechanic friend of mine, he claims that the exhaust headers can be removed without removing the exhaust manifold studs. However, you first have to remove the center exhaust header (2-3) first. Then the outer header (1-4) should come out without having to remove the exhaust header (manifold) studs.

Now, having said all of the above, here's my personal experience. All of the above depends, in large part, on the condition of the engine mounts. With newer engine mounts, the engine sits higher in the engine compartment than it does with older engine mounts. You wouldn't think it would make that much difference but it does. The higher the engine sits in the engine compartment, the easier it is to remove the exhaust manifold. If you have trouble removing the exhaust manifolds because they will not clear the studs, remove the bottom nut from the engine mount on the exhaust side of the engine and jack the engine up on that side until the exhaust manifolds will clear the studs.

7. Remove the exhaust manifolds as follows:
 - a. Disconnect the header where it ties in to the remainder of the exhaust system.
 - b. Remove the manifold mounting studs at the exhaust ports on the cylinder head. This can be done by loosening the retaining nut slightly and installing a second nut onto the stud to act as a "jam nut". While holding the inside nut with a wrench, tighten the outside nut firmly against the inside nut. Then, using the wrench on the inside nut, turn counterclockwise to back the stud out of the head. The other method is to remove the retaining nut from the stud and use a stud extractor to back the stud out of the head. Unless you plan to replace all the exhaust manifold studs, you will need to use an extractor which does not damage the threads on the stud. These can be difficult to find and are sometimes only available as part of a set of extractors making them more expensive.

NOTE

The exhaust manifold studs are M8 threads which normally use a retaining nut that is 13 mm on the flats. However, there are M8 copper nuts available that 12 mm on the flats, are less susceptible to corrosion, easier to get a socket on to remove, and make excellent jam nuts. Because they are smaller on the flats, when used as the outside nut or jam nut, it will be possible to get a 13 mm socket over the jam nut and onto the 13 mm nut on the inside. Not all exhaust stud bolt are accessible with a socket but, this method simplifies removal for the ones that are accessible. Personally, I use the copper nuts all the time because of their corrosion resistance. If I need to remove the exhaust manifold studs, I remove the M8 copper nuts, install the factory M8 nuts (13 mm flats) on the inside, and then re-install the copper nuts on the outside as jam nuts.

- c. When the exhaust manifold studs have been removed, remove the exhaust manifolds from the car.
8. Disconnect the coolant hose at the front of the cylinder head.
9. Disconnect the hose at the back of the cylinder head going to the heater control valve.
10. Using a 6 mm Allen head socket, remove the two Allen head bolts at the front of the cylinder head.
11. Remove the cylinder head retaining nuts. Loosen the cylinder head nuts crosswise from outside to inside.
12. Lift up the cylinder head to remove. Tabs at the front and rear of the head are provided as leverage points. If needed, use a pry bar underneath the tabs to break the head free.

