



BMW N54 Valve Cover Gasket Replacement Instructions



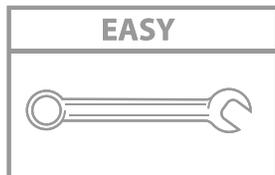
Proper service and repair procedures are vital to the safe, reliable operation of all motor vehicles as well as the personal safety of those performing the repairs. Standard safety procedures and precautions (including use of safety goggles and proper tools and equipment) should be followed at all times to eliminate the possibility of personal injury or improper service which could damage the vehicle or compromise its safety.

INTRODUCTION

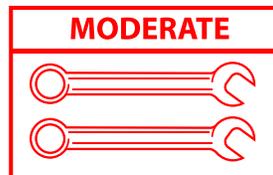
BMW N54 Valve Cover Gaskets

Replace the valve cover gasket on your N54 BMW engine and benefit from the following points:

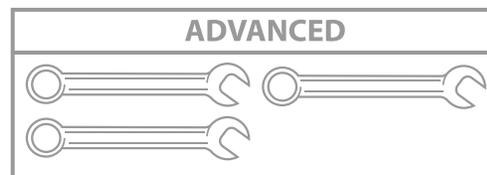
- Stop engine oil leaks to keep your engine compartment clean
- Prevent damaged coils and engine misfires
- Reduce the risk of running low on oil and causing engine damage
- Keep damaging oil spots off your driveway
- Prevent oil from getting on rubber and plastic parts in your engine compartment
- Stop the “burning” or “hot” smell that you sense everytime you drive the car



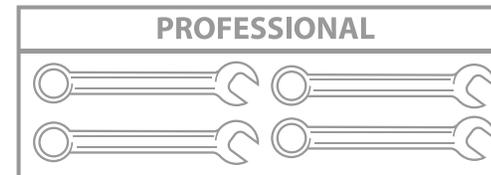
EASY
BASIC SKILLS
REQUIRED



MODERATE
SOME EXPERIENCE
RECOMMENDED



ADVANCED
ADVANCED SKILLS &
EXPERIENCE REQUIRED

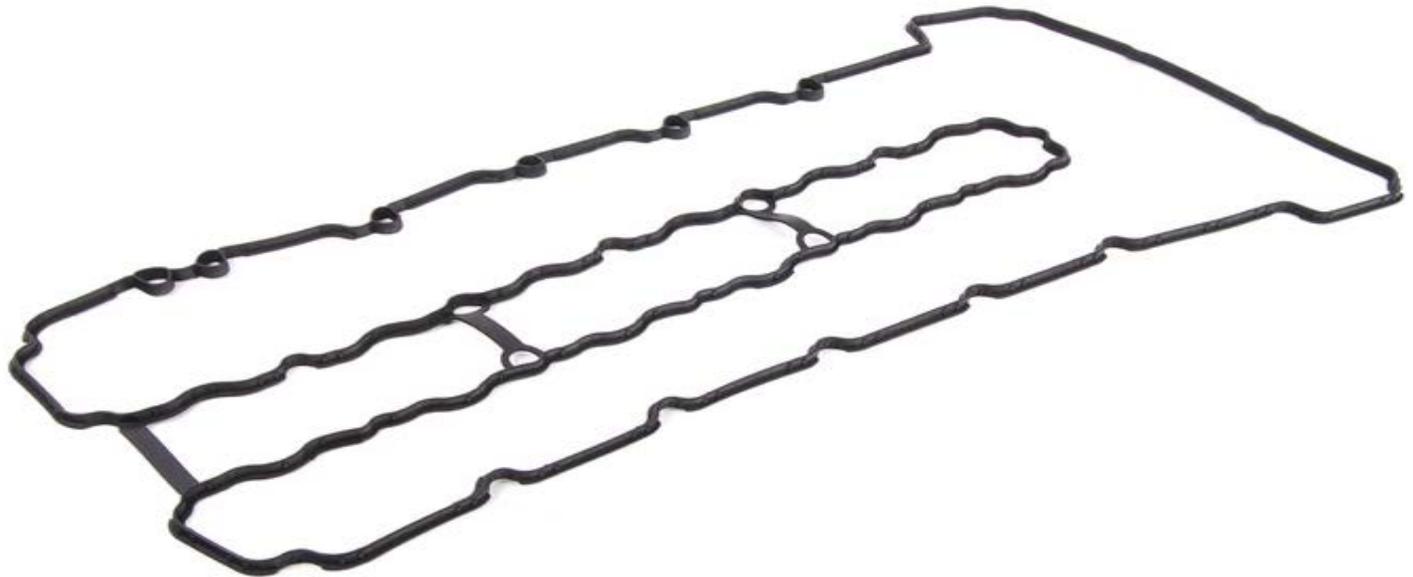


PROFESSIONAL
PROFESSIONAL SKILLS &
SPECIALTY TOOLS REQUIRED

Oil leaks and engine misfires on a BMW N54 engine? A leaking valve cover gasket is a very likely culprit. Stop those annoying oil leaks and engine misfires by replacing your old and brittle valve cover gasket. Although this project is slightly more involved than most cover gaskets, the results are well worth the time. Plan a full day to complete the job. Before you begin, read and familiarize yourself with these instructions and make sure you have all the required tools on hand. Thank you for purchasing an N54 Valve Cover Gasket from ECS Tuning. We appreciate your business!

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REQUIRED TOOLS

Note: The tools required for each step will be listed by the step number throughout these instructions.

We recommend that you have a complete selection of tools and equipment necessary for automotive repair. Below is a list of the tools we used to replace the N54 Valve Cover Gasket. Additional tools may be required for any issues that arise during installation such as rust, corrosion, or broken and stripped fasteners.

- 3/8" Drive Torque Wrench Available at ecstuning.com..... [ES#2221245](#)
- Flat and Blade Screwdriver(s) Available at ecstuning.com..... [ES#2225921](#)
- External Torx Sockets: E10, E14, E18..... Available at ecstuning.com..... [ES#2777804](#)
- Torx Drivers: T20 Available at ecstuning.com..... [ES#11417](#)
- BMW Ignition Coil Ground Stud Removal Tool..... Available at ecstuning.com..... [ES#200045](#)
- 1/4" Drive Torque Wrench
- 1/4" Drive Ratchet, Extensions
- 1/4" Drive Sockets: 6mm, 8mm
- 3/8" Drive Ratchet, Extensions
- 3/8" Drive Sockets: 11mm
- 1/2" Drive Ratchet, Extensions
- Hex Bit (Allen) Sockets: 5mm
- Pick Set
- Open/Boxed End Wrenches: 14mm
- Long Needle Nose Pliers
- Flare Nut Crow's Feet: 14mm

SHOP SUPPLIES AND MATERIALS

- Hand Cleaner/Degreaser..... Available at ecstuning.com..... [ES#2167336](#)
- Aerosol Brake and Parts Cleaner..... Available at your local auto parts store
- Shop Rags Available at your local auto parts store
- Aerosol Spray Lubricant/Penetrating Oil..... Available at your local auto parts store
- Silicone Spray Lubricant..... Available at your local auto parts store
- Gear Oil..... Available at your local auto parts store

INSTALLATION NOTES

- RH refers to the passenger side of the vehicle.
- LH refers to the driver side of the vehicle.
- Always use the proper torque specifications.
- If applicable to this installation, torque specifications will be listed throughout the document and at the end as well.
- Please read all of these instructions and familiarize yourself with the complete process before you begin.

GENERAL PREPARATION AND SAFETY INFORMATION

ECS Tuning cares about your health and safety. Please read the following safety information. This information pertains to automotive service in general, and while it may not pertain to every job you do, please remember and share these important safety tips.

- Park your car in a safe, well lit, level area.
- Shut the engine off and remove the key from the ignition switch.
- Make sure any remote start devices are properly disabled.
- Always wear safety glasses.
- Make sure the parking brake is applied until the vehicle is safely lifted and supported.
- If using an automotive lift, be sure and utilize the factory specified lift points. Lifting a vehicle in an incorrect location can cause damage to the suspension/running gear.
- When lifting a vehicle using a jack, always utilize the factory specified lift points. Lifting a vehicle in an incorrect location can cause damage to the suspension/running gear. Always support the vehicle with jack stands.
- Always read and follow all safety information and warnings for the equipment you are using.



Never get underneath a vehicle that is supported only by a jack. Always make sure that the vehicle is securely supported on jack stands.

REMOVING THE VALVE COVER

Step 1:

Most of this job consists of removing components in order to access and remove the valve cover. Follow these steps closely and you will experience a smooth, trouble free procedure.

Remove the upper wiring harness channel cover by pulling out each of the four tabs (arrows) to release them, then lifting the cover upwards and unhooking it at the rear.



Step 2:

Pull the battery cable and corrugated wiring harnesses out of their retaining clips in the wiring harness channel.



REMOVING THE VALVE COVER

Step 3: Small Pick

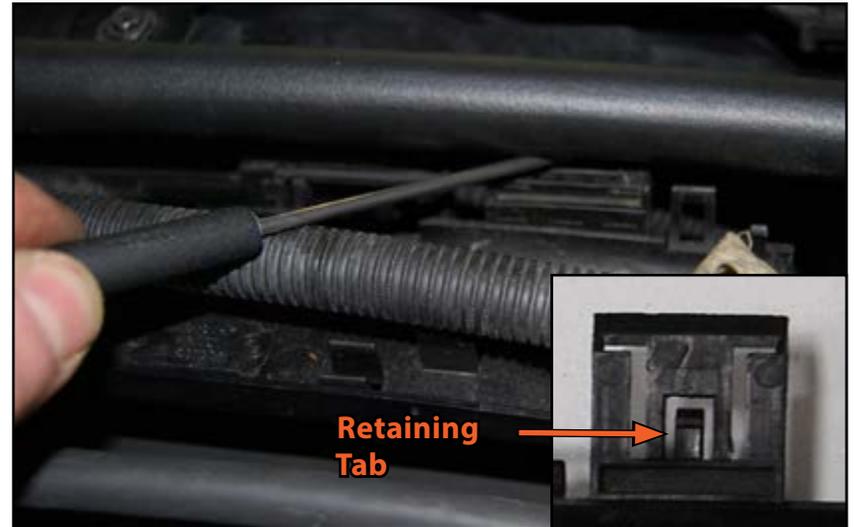
Carefully release the three retainers for the wiring harness channel by pushing down on each retaining tab. As you release each one, pull out slightly on the channel to prevent the tabs from locking back in place. The inset picture shows a close up view of a retaining tab.

NOTE

These tabs and the cowl panel mounts are very fragile and can be easily broken, use caution during removal.

Step 4:

Pull the wiring harness channel forward and remove it from the cowl panel.



REMOVING THE VALVE COVER

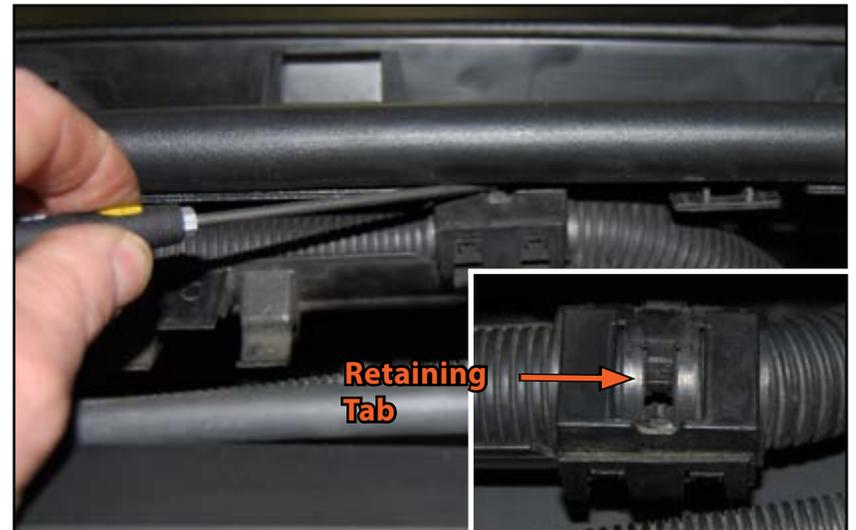
Step 5:

The large corrugated wiring harness mounts to the cowl panel at three different locations (refer to photo on right).



Step 6: Small Pick

Carefully release the three retainers for the large wiring harness by pushing down on each retaining tab. As you release each tab, pull out on the harness to prevent the tabs from locking back in place. The inset picture shows a close up view of a retaining tab.



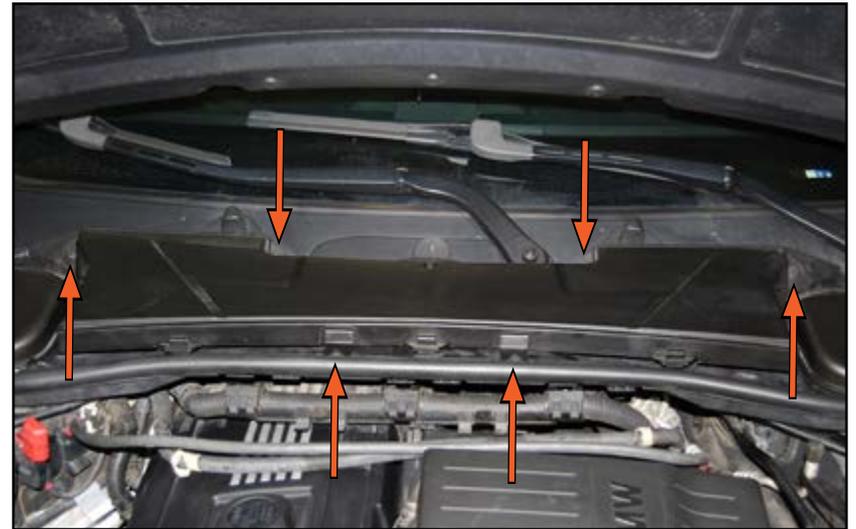
NOTE

These tabs are very fragile and can be easily broken, use caution during removal.

REMOVING THE VALVE COVER

Step 7: 8mm Nut Driver / 8mm Socket and Ratchet

Remove the six self threading screws holding the cabin air filter housing to the cowl panel.



Step 8:

Gently lift up on the cabin air filter housing and remove it from the cowl panel



REMOVING THE VALVE COVER

Step 9:

Remove the brake master cylinder cover by sliding out the rubber seal retainer and releasing the front and rear retaining tabs. Lift the cover up and remove it.



Step 10:

Moving to the passenger side of the vehicle, disconnect the air temperature sensor by pushing in on the connector release tab and pulling the connector off of the sensor.



REMOVING THE VALVE COVER

Step 11:

Remove the air temperature sensor wiring harness retention clips from the cowl tabs by pulling up on them. These clips have small “teeth” that grip the cowl tabs as they are pushed into place, if they are difficult to release by hand, a small flat blade screwdriver can be used to pry them off. Lay the harness to the side after clips have been removed.



Step 12:

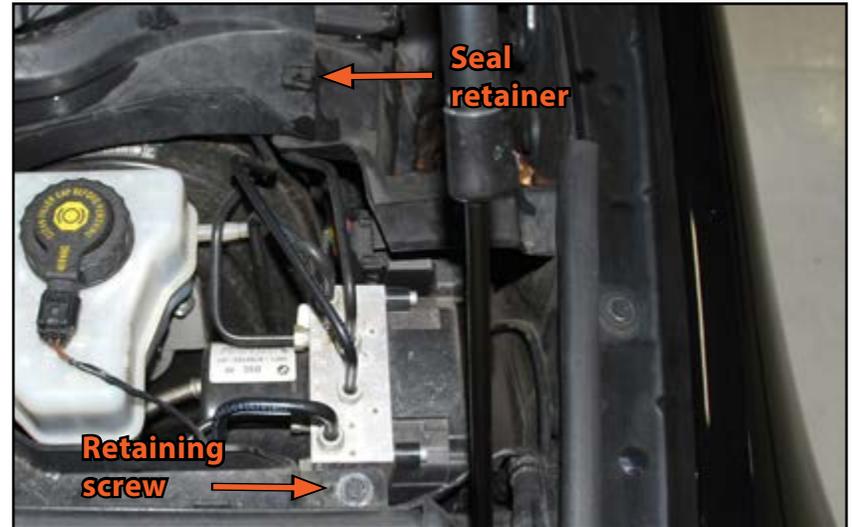
Remove the passenger side cowl cover by sliding out the rubber seal retainer and releasing the front and rear retaining tabs. Lift the cover up and remove it.



REMOVING THE VALVE COVER

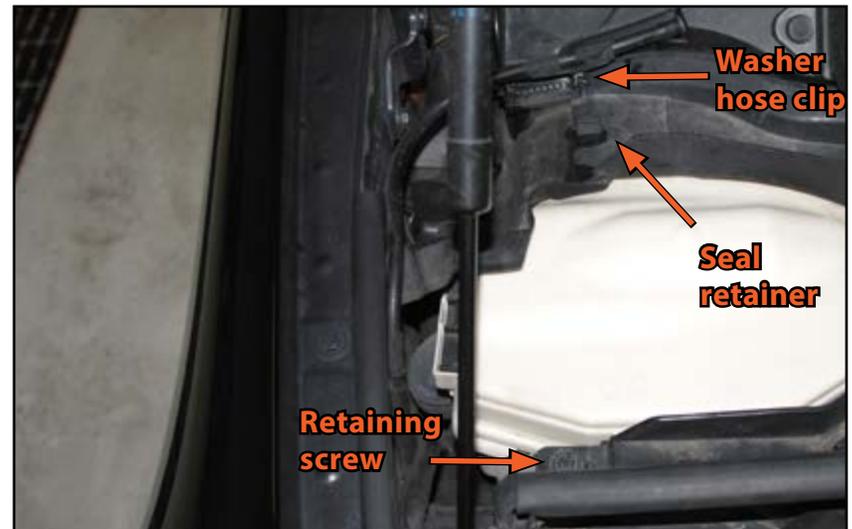
Step 13: 8mm Nut Driver / 8mm Socket and Ratchet

Slide the driver side cowl seal retainer out of the slot in the cowl panel, and remove the screw holding the cowl panel to the body of the car.



Step 14: 8mm Nut Driver / 8mm Socket and Ratchet

Slide the passenger side cowl seal retainer out of the slot in the cowl panel, remove the washer hose retaining clip from the cowl tab. This clip has small "teeth" that grip the cowl tab as the clip is pushed into place. Remove the screw holding the cowl panel to the body of the car.



REMOVING THE VALVE COVER

Step 15:

Tilt the cowl panel up at the front, then lift and pull it forward to remove it from the vehicle.

NOTE

There are five tabs that hold the cowl panel tightly to the seal at the rear of the panel. These can be easily broken, use caution during removal.



Step 16:

Disconnect the brake booster vacuum line by squeezing the two retaining tabs together and pulling up on the line. Pull the line out of the retaining clip on the side of the original air box.



REMOVING THE VALVE COVER

Step 17: 6mm Nut Driver or Flat Blade Screwdriver

Loosen the clamps holding the front and rear turbo inlet tubes to the air original box. (front clamp shown)



Step 18: T20 Torx Drive

Remove the two screws holding the intake air duct to the radiator core support.



REMOVING THE VALVE COVER

Step 19: Flat Blade Screwdriver

Release the intake air duct from the tabs on the original air box, pull the intake air duct off of the original air box and remove the duct from the vehicle.



Step 20:

Pull all three wiring harness retainers off of the retainer bracket on the side of the original air box



REMOVING THE VALVE COVER

Step 21:

Remove the front and rear turbo inlet tubes from the original air box.



Step 22:

Lift up on the air box and remove it from the vehicle. Be careful to make sure all hoses and wires are clear while removing the air box.



REMOVING THE VALVE COVER

Step 23:

Locate the strut brace inner mount access cap (highlighted).



Step 24: Large Flat Blade Screwdriver

Turn the access cap 1/8 turn counter clockwise.



REMOVING THE VALVE COVER

Step 25: E18 Socket, 1/2" Ratchet

Lift the access cap off by hand, then remove the E18 Bolt that secures the center of the strut brace.



Step 26: E14 Socket, 3/8 Ratchet

Remove the outer bolt securing the RH strut brace to the strut tower, then pull the strut brace out from the center of the cowl and place it off to the side.



REMOVING THE VALVE COVER

Step 27: 5mm Hex Bit (Allen) Wrench or Socket

Remove the three securing screws for the upper engine cover and remove the cover to access the fuel and ignition components.

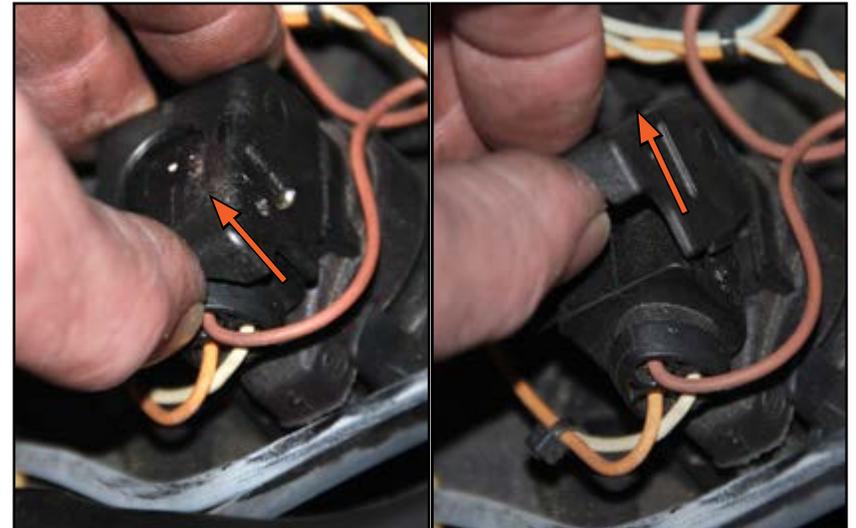
NOTE

This valve cover is a very close fit to a number of components. Skipping what may seem like an insignificant step will make removal much more difficult and may result in damaging some of the components on the car.



Step 28:

Disconnect each of the six ignition coils in the following manner: Grasp each connector lock with your thumb under the edge and pull up to release the lock.



REMOVING THE VALVE COVER

Step 29:

Continue to pivot the connector lock up until it is completely vertical. As you do this the base of the connector lock will push the connector most of the way off of the coil, you can then pull each connector completely off by hand.



Step 30:

Grasp the top of each ignition coil and remove them all by pulling them straight up and out of the spark plug wells.

TECH TIP

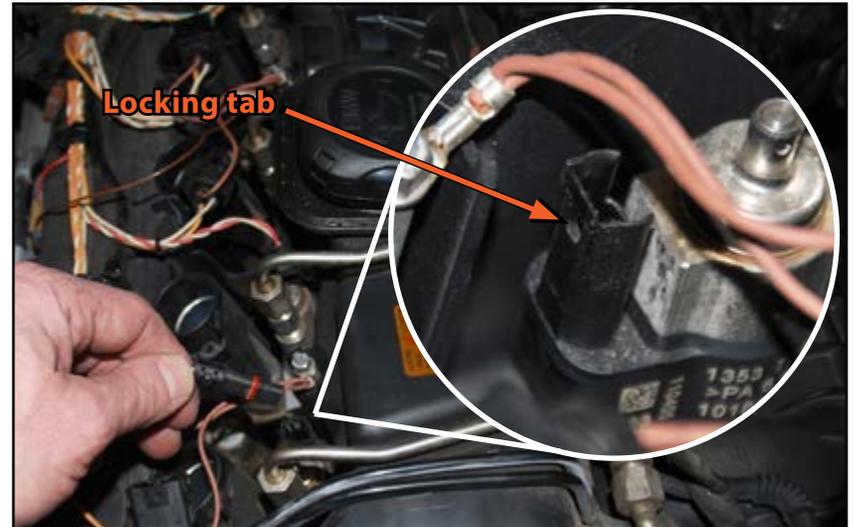
Keep all six ignition coils in order so they can be reinstalled in the same location. This is important for any future ignition system service.



REMOVING THE VALVE COVER

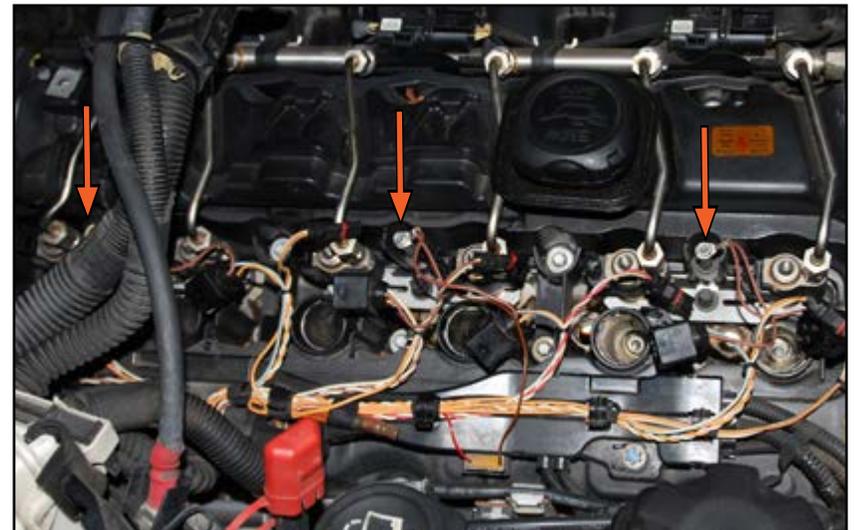
Step 31: Small Pick or Flat Blade Screwdriver

Disconnect each of the six fuel injector electrical connectors. Each one has a small locking tab that can be released by gently prying the tab away from the connector.



Step 32: 8mm Socket, 1/4" Ratchet

Disconnect each of the three ignition ground wires.



REMOVING THE VALVE COVER

Step 33: E10 Socket, 1/4" Ratchet

Remove the two wiring harness channel hold down bolts.



Step 34:

Disconnect the two connectors (orange arrows) and unclip the two wiring harnesses (green arrows).



REMOVING THE VALVE COVER

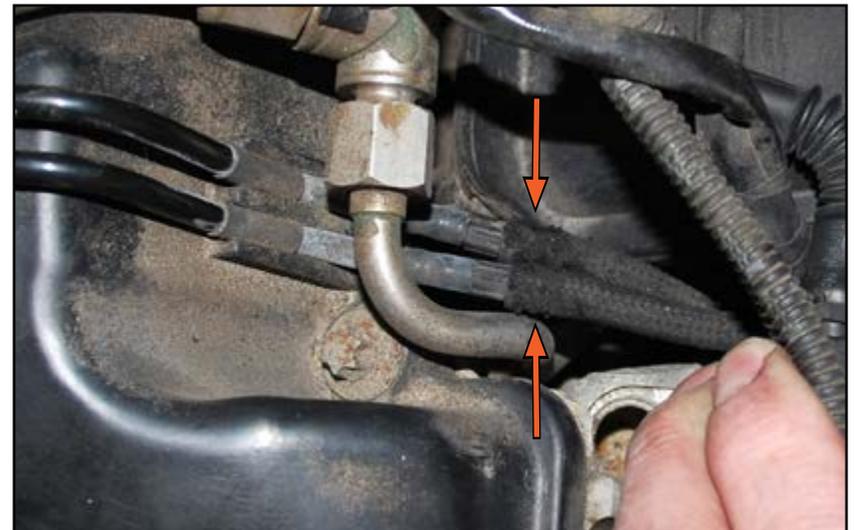
Step 35: Two Small Angled Picks

Gently hold the ignition/fuel injector wiring harness out of the way and remove each of the six ignition coil sleeves. Each sleeve has two small holes in the end. Using a small pick in each hole, pull the sleeve halves together and pull them straight out of the valve cover.



Step 36: Small Angled Pick

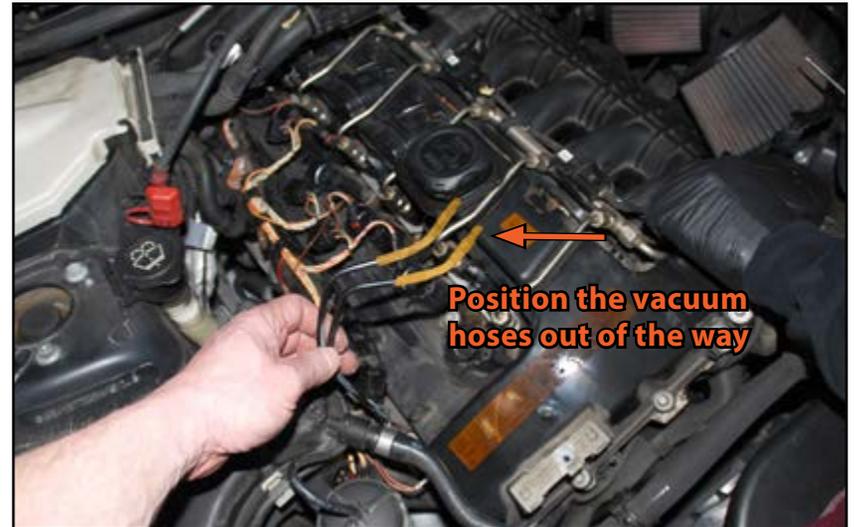
Locate the two small vacuum lines that run across the front of the valve cover. Carefully disconnect the hose that is connected to each one near the front of the fuel rail.



REMOVING THE VALVE COVER

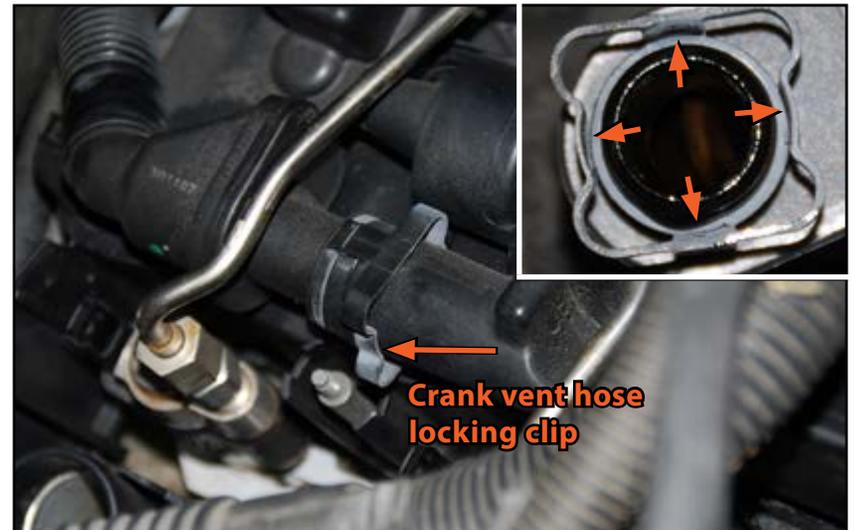
Step 37: Flat Blade Screwdriver

Gently pry the vacuum lines loose from the valve cover, then pull them out from underneath the fuel rail and position them off to the side.



Step 38: Small Angled Pick

Remove the crank vent hose from the back of the valve cover. These can be a little tricky. You will have to release the locking clip at four locations to be able to remove the hose (see inset photo). The best method we have found is to pry out one of the tabs while holding rearward pressure on the vent hose. Once the tab clears the lip on the valve cover, keep holding rearward pressure on the hose and pry out the next tab until it clears the lip. Continue with the remaining two tabs until the crank vent hose is released.



REMOVING THE VALVE COVER

Step 39: Small Angled Pick

Now that you have practice, disconnect the other end of the crank vent hose and remove it.



Step 40: 10mm Socket, 1/4" Ratchet

Remove the coolant reservoir mounting bolts (orange arrows). (The coolant reservoir will need to be pulled back slightly when you remove the valve cover).



NOTE

Be careful not to pull on the hoses for the vacuum reservoirs (green arrows). They can easily pull off and the reservoir nipples can easily be broken

REMOVING THE VALVE COVER

Step 41:

Unclip the wiring harnesses along the back side of the valve cover. These are difficult to see and you may have to do it mostly by “feel”. This close up view of the back of the valve cover off the car will give you an idea of harness location.



Step 42: 14mm Wrench

CAUTION

The fuel injector lines must be disconnected and the fuel system is under extremely high pressure. Follow these steps closely, wear safety glasses, and be sure to have a fire extinguisher on hand when opening the fuel system.

Place a wrench over the first fuel injector fitting at the fuel rail, then place a shop rag over the fitting and the end of the wrench. Loosen the fitting and allow the fuel pressure to bleed off. Lightly tap the fuel line and wiggle it back and forth to make sure the fuel pressure has bled off.



REMOVING THE VALVE COVER

Step 43: 13mm, 14mm Wrench

Work your way down, removing all six fuel injector lines. Be sure to hold the fuel injector with a 13mm wrench when loosening the line at the injector. Keep a rag over the openings in the fuel rail as you go.

NOTE

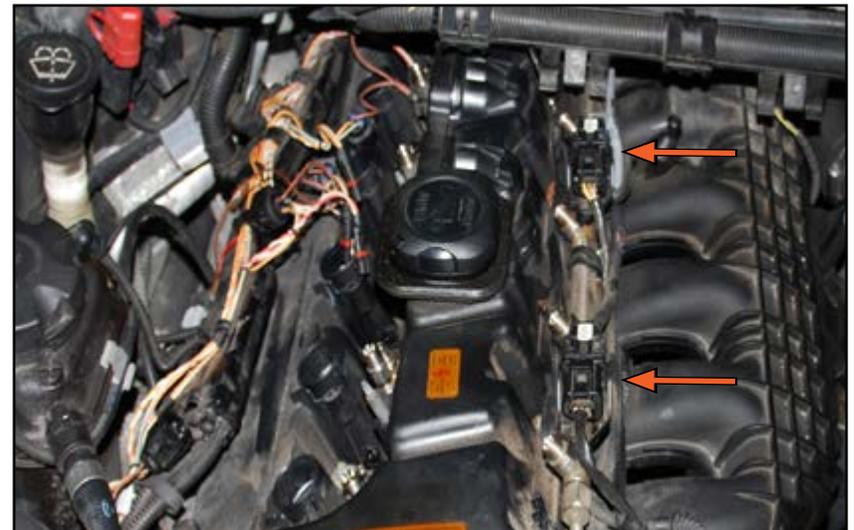
Be sure to keep all six fuel injector lines in order so they can be reinstalled in the same positions.

Step 44:

Unclip the two electrical connectors from the fuel rail.



Hold the fuel injector while loosening the line



REMOVING THE VALVE COVER

Step 45:

Remove the wiring harnesses from the three clips on the fuel rail.



Step 46:

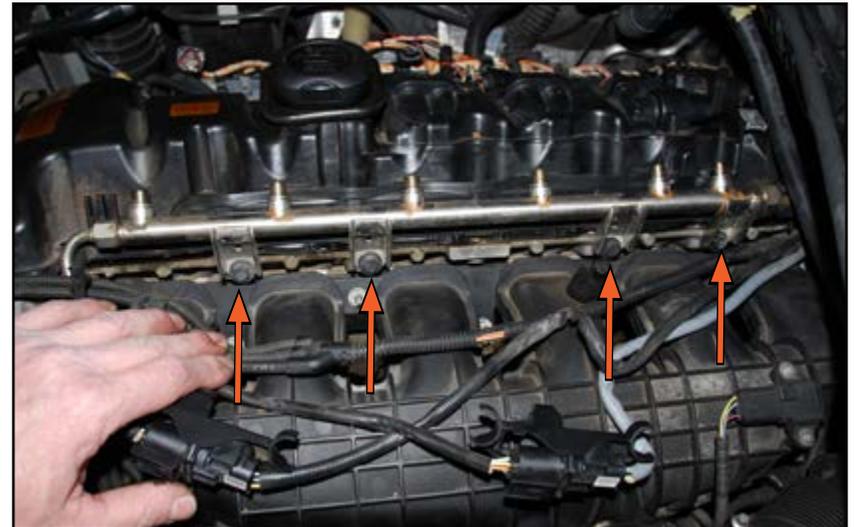
Remove the three clips on the fuel rail by simply pushing down on them with your thumb then pivot them out and upward and unclip them from the rail.



REMOVING THE VALVE COVER

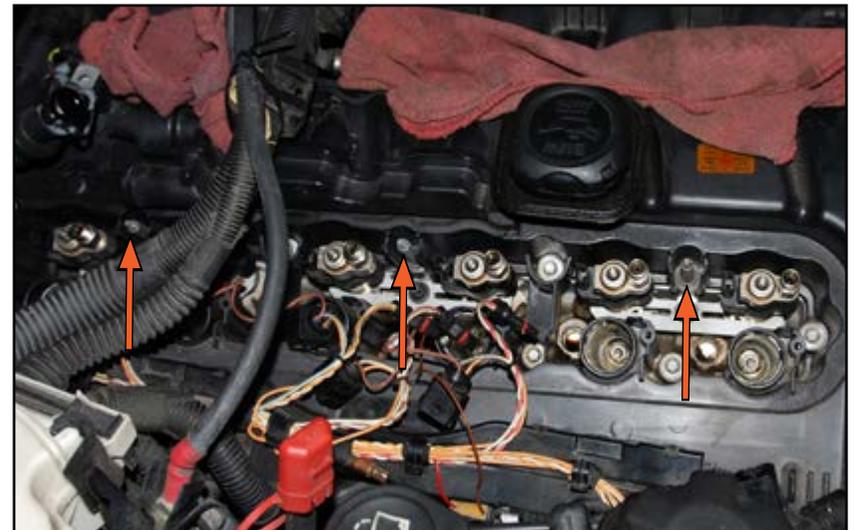
Step 47: 11mm Socket, 3/8 Ratchet

Remove the four bolts holding the fuel rail to the cylinder head.



Step 48: BMW Ground Stud Removal Tool, Long Needle Nose Pliers

Remove the three ignition system ground studs. Once you have completely loosened them, you may have to grip them with a pair of pliers to pull them out.



REMOVING THE VALVE COVER

Step 49: E10 Socket, 1/4" Ratchet, Long Needle Nose Pliers

Remove all of the valve cover hold down bolts. There are a total of 28 bolts (26 bolts are 32.5mm in length, 2 bolts are 38mm in length). When you have fully loosened the bolts, you may have to use a long pair of needle nose pliers to pull them out.

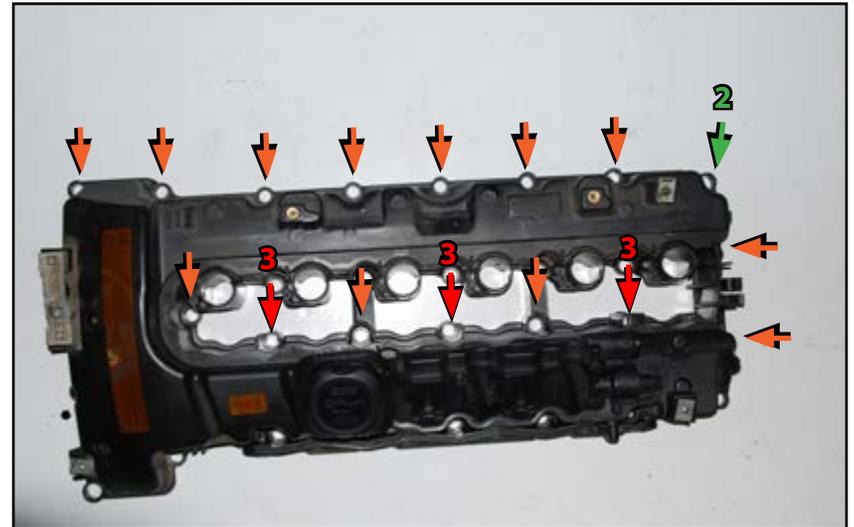
Note the close up bolt detail in the lower right. The spacer on each bolt will hold it in the valve cover, requiring you to pull them out with pliers.

Use the pictures on the right as a reference for bolt location.

- Orange Arrows: 32.5mm bolts
- (2) Green Arrows: 38mm bolts
- (3) Red Arrows: Ignition Ground Studs

Step 50:

You are now ready to remove the valve cover from the engine. You may have to gently pry the valve cover loose if the gasket is stuck. You will have to hold the wiring harnesses and coolant reservoir out of the way when removing the valve cover. If possible, enlist the help of a friend to make things easier.



REMOVING THE VALVE COVER

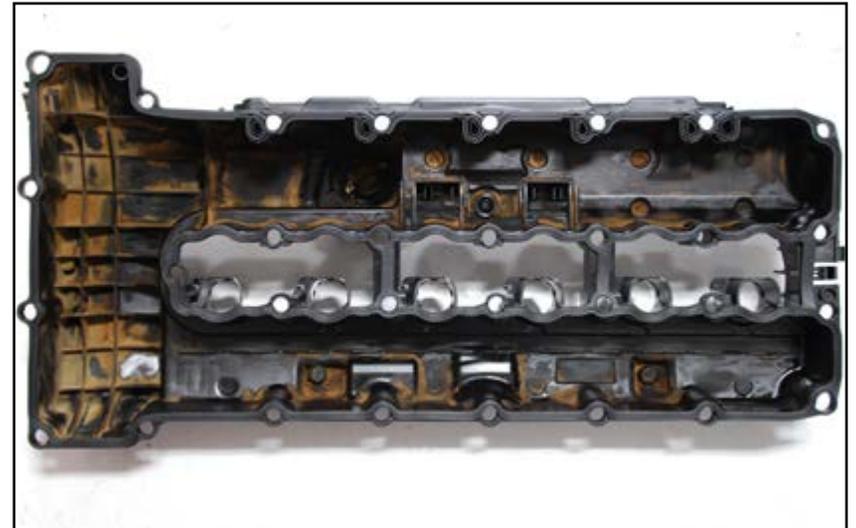
Step 51:

Wipe the gasket surfaces of the cylinder head clean with a shop rag and make sure there are no pieces of the old gasket sticking to the cylinder head.



Step 52: 13mm, 14mm Wrench

Thoroughly clean the valve cover, making sure all traces of the old gasket are removed from the groove in the cover. Install the new gasket into place, making sure it is fully seated around the entire perimeter of the valve cover and ignition coil opening.



REINSTALLING THE VALVE COVER

Reinstalling the valve cover is the reverse of removal, but for convenience and accuracy we have provided this checklist along with torque specifications and important information.

Install the valve cover back onto the cylinder head.

Loosely install all of the valve cover mounting bolts and ignition ground studs.

Torque all of the valve cover bolts and ground studs to 8.5 Nm (75 in-lbs).

Install and tighten the four bolts for the fuel rail.

Install the three fuel rail clips.

Install the wiring harnesses back into the fuel rail clips.

Clip the electrical connectors back onto the fuel rail.

Lubricate the threads of the fuel line nuts with gear oil.

Loosely install all fuel lines.

Using a flare nut crow's foot, torque the fuel line nuts to 23 Nm (17 Ft-lbs).

Be sure to hold the fuel injector when torquing the fuel line nuts.

Reattach the wiring harness to the back of the valve cover.



REINSTALLING THE VALVE COVER

Reinstall the coolant reservoir mounting bolts.

Make sure the vacuum reservoir hoses are still connected.

Reinstall the crank vent hose.

Reconnect the two vacuum lines across the front of the valve cover.

Push the ignition coil sleeves back into place in the valve cover.

Reconnect the two connectors and wiring harnesses near the coolant reservoir.

Install the wiring harness channel hold down bolts.

Install the three ignition ground wires.

Connect each of the six fuel injector electrical connectors.

Install and connect all six ignition coils.

Install the upper engine cover.

Install the strut brace and loosely install both bolts.

Torque the inner strut E18 bolt to 100 Nm+90 degrees (74 Ft-lbs+90 degrees) and reinstall the cap.

Torque the outer strut E14 bolt to 40 Nm+60 degrees (30 Ft-lbs+60 degrees).

Reinstall the air box and cowl panels.

TORQUE SPECIFICATIONS

Fuel Lines.....	23 Nm (17 Ft-lbs).....	(Page 32)
Strut Bar E14.....	40 Nm+60 degrees (30 Ft-lbs+60 degrees).....	(Page 33)
Strut Bar E18.....	100 Nm+90 degrees (74 Ft-lbs+90 degrees).....	(Page 33)
Valve Cover Bolts.....	8.5 Nm (75 in-lbs).....	(Page 32)

• A note about torque to yield or “stretch” bolts: Many bolts will have a torque specification listed in the format - xx Nm+xx degrees (xx Ft-lbs+xx degrees). These bolts are torque to yield bolts, commonly referred to as “stretch” bolts. The correct procedure for torquing these bolts is: **Stage One** - torque them to the Nm or Ft-lb specification. **Stage Two** - tighten each one the additional specified number of degrees. To prevent over torquing it is important to mark each fastener with paint **immediately** after performing the second stage or “stretching” of the bolts.

Your BMW N54 Valve Cover Gasket Replacement is complete!



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