R56 Carbon Build-Up Cleaning

For all Cooper S 2007-Up R56

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Revision: NC
Author: J. Pendlum (NAM User: Texasmontego)

ISSUE: Carbon build-up on the valves and intake ports resulting in decreased performance

TOOLS REQUIRED

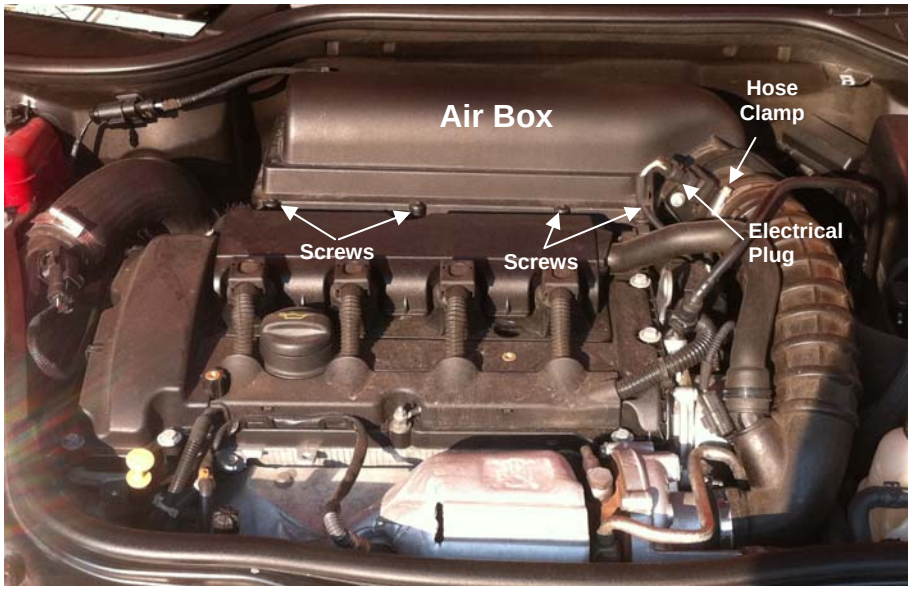
- Air Compressor with spray nozzle
- Medium size mirror
- Flashlight
- Sockets: 7, 10 & 13mm, 13mm Deep Socket
- Ratchet & Extensions
- T25 & T27 Torx
- Assorted Flat & Phillips screwdrivers
- Pick
- Metal & nylon bristle brushes
- Children's Toothbrush or some kind of small brush
- Heavy Duty Carb & Throttle Body Cleaner (Recommended: Berryman B-12 Chemtool)
- Shop towels or rags (that can be thrown away)
- Small container for screws and misc. small pieces
- Safety glasses

Note:

An air compressor is required to do a thorough and easy cleaning of the valve ports. If you do not have access to a compressor, do not start the project. The compressor is used to blow out any piece or other debris from the ports during cleaning.

Disassembly

1. Put on Safety Glasses. You will be using Carb cleaner which can damage your eyes.
2. Disconnect the positive terminal on the battery (10mm socket & small ratchet)
3. Remove the top of the air box.
    a. Disconnect the electrical plug (See arrow)
    b. Qty. 4 – T27 Torx screws (See arrow)
    c. Loosening the hose clamp with a flat screwdriver (See arrow)
    d. Lift up on the front of the air box and slide towards the front of the vehicle, and then disconnect the hose.



4. Remove the bottom of the air box.
    a. Remove the T27 Torx screw from the passenger's side of the air box bottom (See picture)

b. Lift up with the air box bottom. There are 3 grommets securing the box to the manifold.

c. Rotate the box backwards to disconnect the hose on the lower right-hand side (See picture).

d. Make sure to remove the grommets and store in a small container for reinstallation.

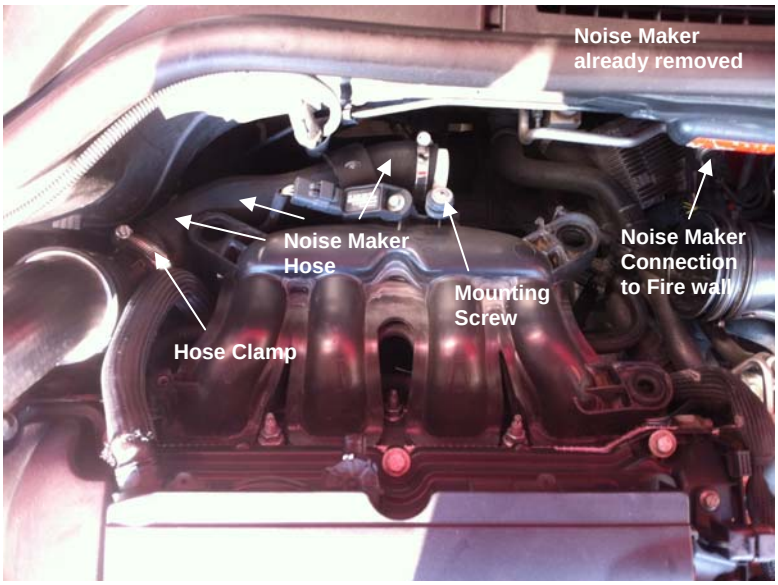
5. Remove the Noise Make and Hose assembly.

a. Using a flat screwdriver, loosen the hose clamp on the left side (See picture).

b. With a Phillips screwdriver, remove the mounting screw securing the Noise Maker to the intake manifold (See picture)

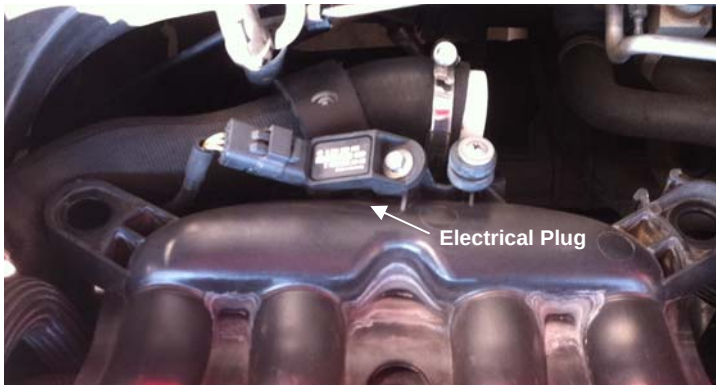
c. Disconnect the tubing from the firewall by pulling down.

d. Remove the assembly (depending on the age of your vehicle, you may need to use a flat screwdriver to loosen the hose from the existing piping on the left side)

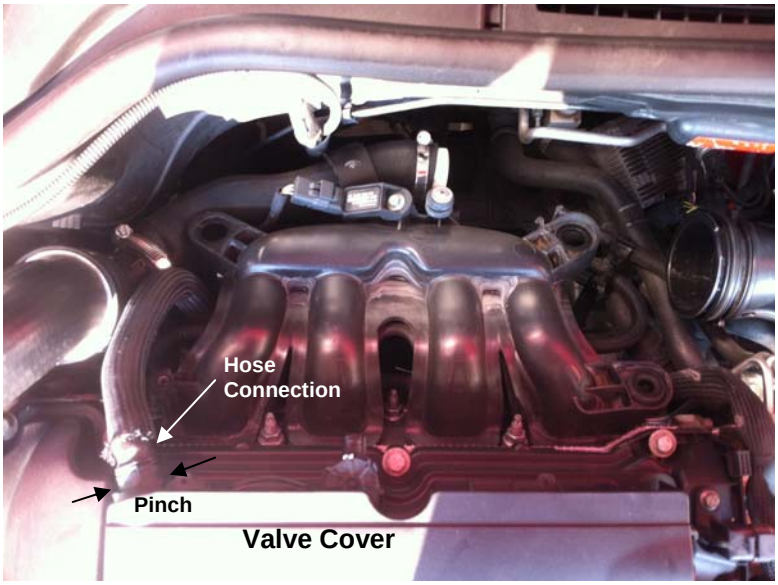


6. Remove the Intake Manifold

a. Disconnect the electrical connection located at the top center of the manifold.



b. Disconnect the hose at the top of the valve cover. Pinch the sides of lock collar and pull the hose connection away from the valve cover.

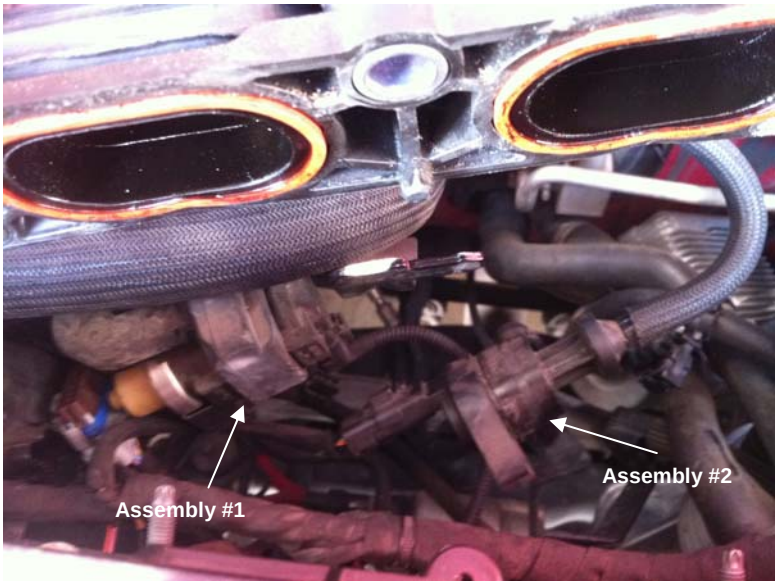


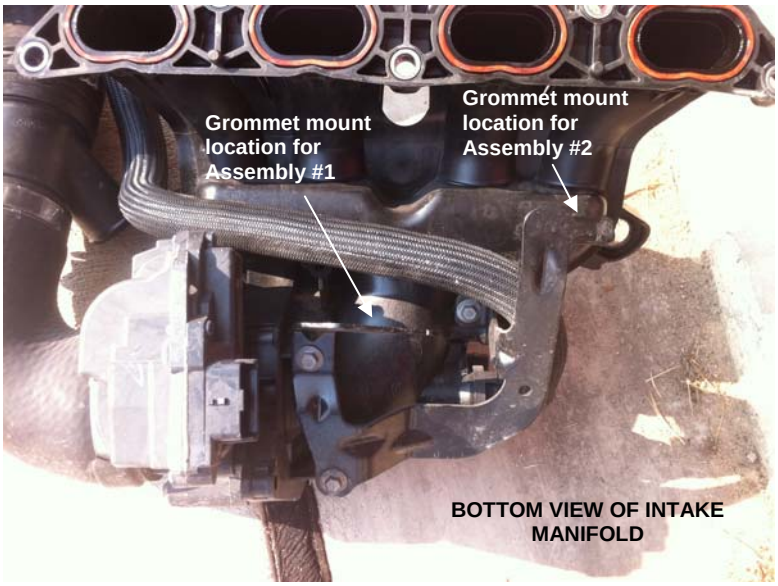
c. Using a deep 13mm Socket, remove the Qty. 5 nuts securing the manifold to the engine.

d. With a long flat screwdriver, loosen the hose clamp on the lower end of the manifold assembly.

e. Remove the manifold from the engine and rotate back. This will expose the underside of the intake manifold where additional items need to be removed.

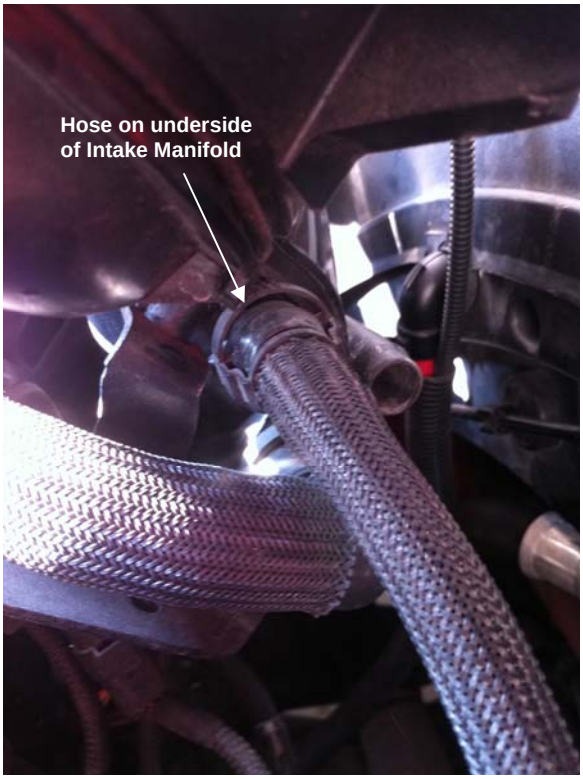
f. There are 2 assemblies attached to the manifold by rubber grommets (See picture).





g. Slide both assemblies/rubber grommets off to the side disconnecting them from the manifold.

h. Disconnect the hose from the manifold. Pinch the sides of the lock collar and pull straight out.

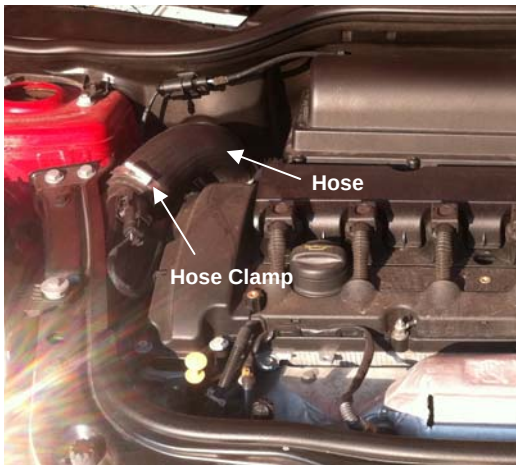


i. Disconnect the electrical plug to the Throttle Body, on the bottom of the manifold.

j. Remove manifold from vehicle.

7. Remove the large hose on the passenger's side of the engine bay.

   a. Use a flat screwdriver to loosen the hose clamp at the top and remove the hose.



Note: Be careful removing the hose. It may catch on other components

8. Remove Throttle Body from Intake Manifold

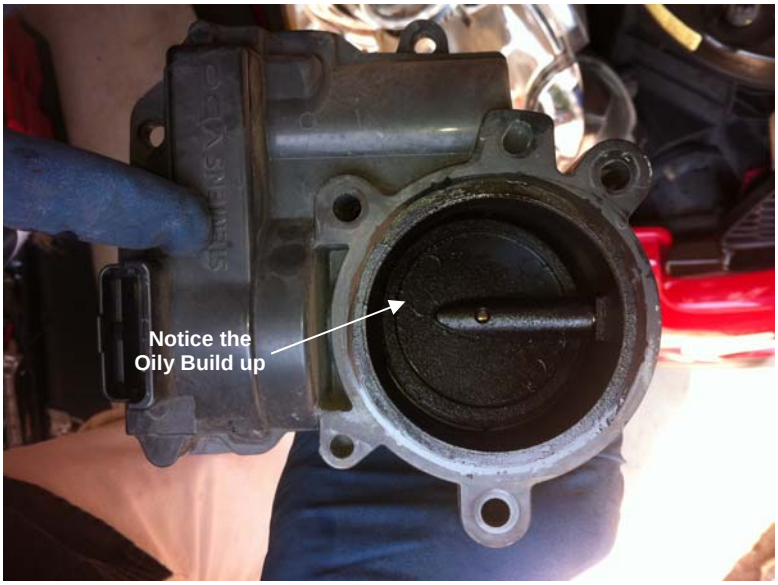
   a. Remove Qty. 3, T27 Torx screws securing Throttle Body to Manifold.

9. Determine which valves are closed. Use the Mirror and Flashlight to view inside the intake ports. Depending on the level of build-up this may be difficult.

   a. The two outer ports and the two inner ports run in sync. If you can determine one of the outer ports is closed, then you know the other outer port is closed as well. Visa versa with the inner ports.

   b. Using the Carb Cleaner, spray a generous amount into the closed ports and allow soaking for at least 10-15 minutes. The Carb Cleaner will pool inside the closed ports. If it does not pool, then that port is not closed.

10. Inspect all parts removed from the vehicle. You will notice an oily build-up on the interior of all components. Using a rag and carb cleaner, clean the interior and exterior of all components. (My throttle body, hoses and manifold had extreme build-up, so you may have to use the nylon brush to remove all residue.)



WARNING: Use only nylon/plastic brushes on the plastic pieces. Metal brushes could damage important components.

11. Clean the 2 closed ports/valves. This must be done by hand. Do not use a dremel, drill or any mechanical device as those could damage the valves

a. Using the mirror (I found a makeup mirror at Wal-Mart under $5, and it provided a good working size) inspect the ports to see how/where you will be scrubbing.

b. With a children's toothbrush (This was the only brush I could find that was small enough to fit in the ports while providing enough brushes to clean around the valves) begin scrubbing the port.

c. The whole port needs to be cleaned. Alternate between the metal brush and the small brush. Clean the brushes periodically to remove any large pieces you may have released during scrubbing.

d. Using the Air Compressor and nozzle, blow out the port. You may want to soak up some of the carb cleaner before you blow it out as this step makes a mess. Before you blow it out, cover the port with a rag/towel.

WARNING: Make sure you are wearing your safety glasses. You do not want Carb Cleaner in your eyes.

e. Use the pick tool to scrap any thick or large particles inside the port. I used the pick tool to remove the debris behind/around the valves)

f. Repeat step 11 until the valve is clean. You may need to allow the cleaner to soak for a longer period depending on the level of build-up.

Note: Depending on the level of build-up, you may need to repeat this step 5+ times.

12. Close the remaining 2 ports/valves for cleaning. You will need another person for this step.

a. You need to close the other 2 ports for cleaning, but the only way to do this on the Mini is to turn the motor over. As you know, with the electronic start, the starter will continue to turn until the motor runs. You only need the motor to turn enough to close the other 2 ports.

Pull the 4 spark plug connections/boots from the spark plugs. This will prevent any accidental starts.

With a second person, connect the battery by holding the battery cable to the positive terminal of the battery (use a glove). Do not touch the metal terminal or you could get shocked.

Put the key in the ignition and push the Start/Stop button. The second the motor begins to turn, have the second person remove the battery cable from the battery.

Note: From the moment you press the Start/Stop button until the battery is disconnected should only take 1-2 seconds.

Check to see if the other two ports are now closed. If they are not closed, repeat Step 12.

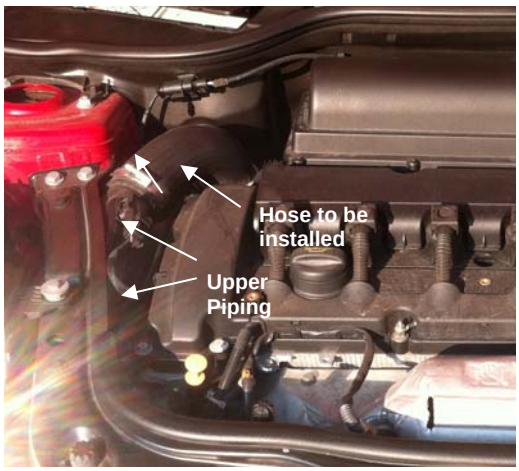
Once you have closed the remaining ports, reinstall the spark plug connections/boots.

13. Repeat Step 11 to clean the remaining 2 ports.

Re-installation

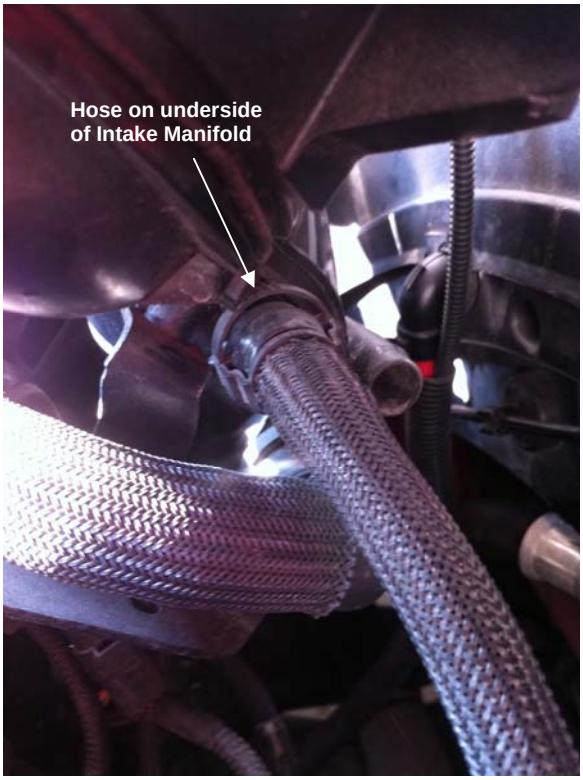
14. Connect the Throttle Body to the Intake Manifold with the Qty. 3 – T27 Torx screws.

15. Install the Hose to the upper piping on the passenger's side of the engine bay. Maneuver the hose down behind the motor into position. Connect the upper connection, but do not tighten the hose clamp. (If the hose is difficult to get on the connection, use a small amount of WD-40 to lubricate the end).



16. Install the Intake Manifold.

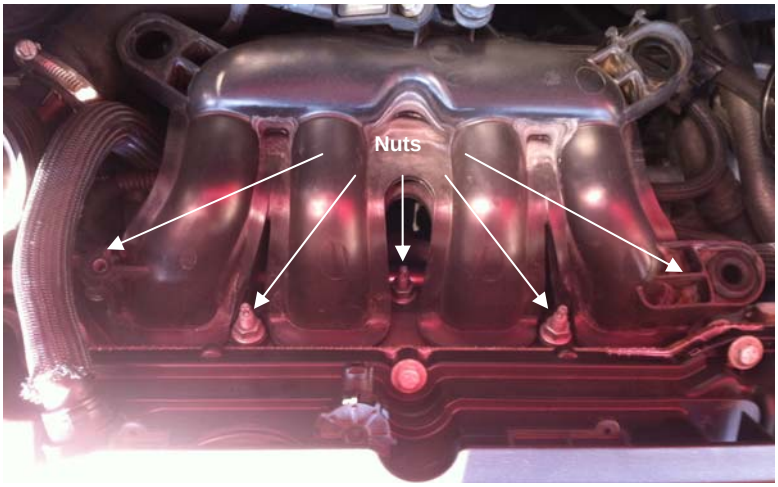
a. Connect the small hose to the underside of the manifold (snap into position)



b. Connect the electrical plug to the Throttle Body.

c. Press on the 2 rubber grommet assemblies (removed in Step 6f & 6g) and make sure all connections to these 2 assemblies are secure.

d. Install the Intake Manifold on the treaded studs connecting it to the engine. Using a 13mm Deep Socket & Ratchet, tighten the Qty. 5 nuts. (Be sure to hand tighten each nut before using the ratchet. You want equal pressure across all 5 nuts)

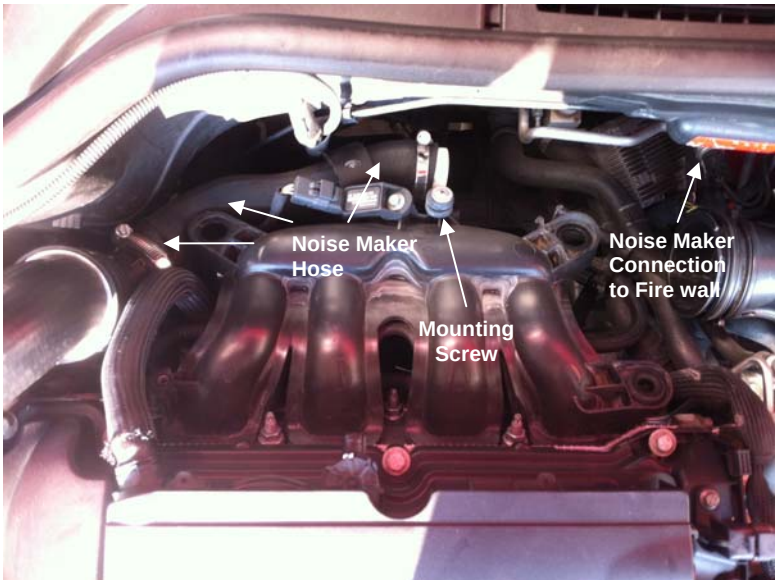


e. Connect the Hose to the lower end of the Manifold and tighten the upper (from Step 15) & lower hose clamp securing it in position. (You can use a small amount of WD-40 to lubricate the hose end)

f. Connect the small hose to the connection at the top of the valve cover.

g. Connect the electrical plug to the top of the intake manifold (See picture above)

17. Install the Noise Maker & hose assembly. (The Noise Maker isn't pictured below as I removed mine permanently.)



a. Attach the hose to the left connection and tighten the hose clamp with a flat blade screwdriver.

b. Install the mounting bolt to the cylinder Noise Maker (See picture above).

c. Snap the end connection to the fire wall (See picture above).

18. Install lower air box

a. Install 3 rubber grommets into the mounts on the intake manifold.

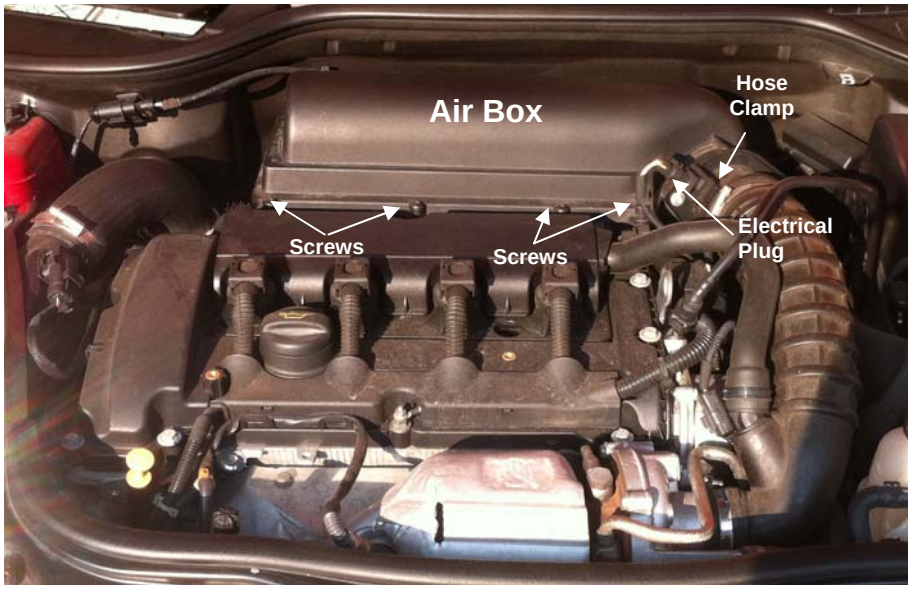
b. Connect the plastic pipe to the lower right side of the air box. Rotate the air box to lock the pipe into position.

c. Snap the lower air box into the 3 grommets and install the T27 screw.

19. Install the air box Top

a. Clean air filter

b. Slide the rear of the air box into the plastic locks.



c. Connect the hose to the air box

d. Tighten the Qty. 4 – T27 screws on the front of the air box.

e. Tighten the hose clamp with a flat screwdriver.

f. Plug in the electrical connection.

20. Re-check all hose clamps, electrical connections & oil level.

21. Connect Positive terminal to the battery & start the Mini.

22. If you get any check engine lights or messages, recheck all hose connections and electrical plugs.