

Motordyne Engineering Inc.

Plenum Spacer & MREV2 Manifold™ Installation

May 31, 2007

Read all instructions before starting!

- 1 Motordyne Plenum Spacer with gaskets applied
- 18 M6 washers
- 11 High Strength bolts M6 x 1mm x 35mm
- 3 High Strength bolts M6 x 1mm x 55mm
- 4 High Strength bolts M6 x 1mm x 70mm
- 6 High Strength Strut Bar bolts M10 x 1.25mm x 30mm (2003.5+ 350Z only)
- 8 Strut Bar Spacers (350Z only)
- 4 Strut Bar Washers (350Z only)
- 6 Iso Thermal Plenum Internal Spacers
- 1 Iso Thermal Aramid Manifold Gasket (Iso Thermal upgrade only)
- 1 Iso Thermal Coolant Control Valve (Iso Thermal upgrade only)
- 1 Copper Throttle Body Heater (Copper Iso Thermal upgrade only)
- 1 Lower Collector Replacement (MREV2 only)
- 1 Loctite Thread Locker (spacers only)

Verify your kit contains all the parts listed above before starting.

Tools Required:

Flat head screwdriver

Large adjustable crescent wrench

Inch-Lb Torque wrench with extension or nut driver and leather gloves

17mm, 10mm, 8mm and 4mm metric sockets

Heavy duty scissors

Teflon pipe thread putty

Pliers

Engine Idle Check:

Start the engine and allow it to idle for about 30-60 seconds. While at idle listen to the engine and plenum area to become familiar with how it sounds at idle. There will be a rubber hose near the left side of the plenum area that emits a small hissing sound. This is normal.

Then shut down the engine and disconnect the battery negative terminal. Allow the engine to cool overnight before starting the installation. Warm or hot aluminum tends to stick to bolts. A thoroughly cool engine will allow removal and installation of bolts with less friction and will also provide the proper tension when the new bolts are torqued in.

Strut Bar Removal for 350Z owners:

Remove the strut bar. Loosen the (two) 24mm jam nuts on the left hand side. Mark the center hex adjuster and loosen it one full turn. Remove the (6)14mm head bolts and (2)14mm head nuts. Use a screw driver on the lock of the slide on wire connector and slide off. Use needle nose pliers to squeeze the snap in wire connectors and push them out. Carefully lift bar out of the way and set aside.

Remove engine cover:

Remove the (2)10mm head nuts and (2)10mm head bolts. Carefully lift cover and set aside.

Disconnect the air intake tube from the throttle body:

Using a flat head screwdriver, loosen the hose clamp and pull air tube back carefully. Then use the socket wrench to loosen the hose clamp at the MAF and pull hose off carefully. Move the oil vapor hose clamp aside with a pliers and disconnect the hose. Set air tube aside. If you are using a stock air tube it is best to remove it entirely.

Disconnect the vacuum line on the battery side of plenum

Use pliers to squeeze the clamp and move it two inches toward the battery. Slide hose off of nipple.



Loosen and remove all plenum bolts:
 Remove all (16)10mm head bolts and (2)10mm head nuts. Also remove the 2 guide pins in the lower plenum. They can often be removed with a 4mm socket. If a 4mm socket is not available or it doesn't quite fit, open the plenum wide and using the original nut, turn it upside down and thread it back onto the stud about ½", then take the other nut and tightly screw it on right side up as shown.



You are now ready to remove the guide pin. Use the 10mm open ended wrench on the bottom nut to unscrew it. For easy alignment, leave the two 4mm guide pins in but loosened so that they can be removed after the plenum top is lowered.

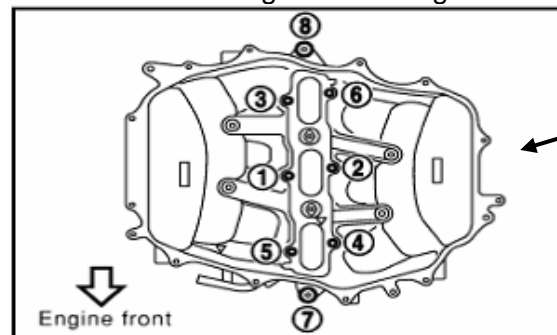
Cleaning the interior of the plenum:
 After unplugging the two hoses at the back of the plenum, lift the upper plenum and tilt it aside as shown. Use a paper towel to wipe up any dirt and oil. Clean the top, bottom and around the edges to remove any debris. The interior of the plenum may be very oily but this is normal and OK. You can leave the stock gasket in place but you can take it out too. Either way it will seal well. Some people prefer to leave them in just to keep the stock gasket in the event they sell the car and take out the spacer.



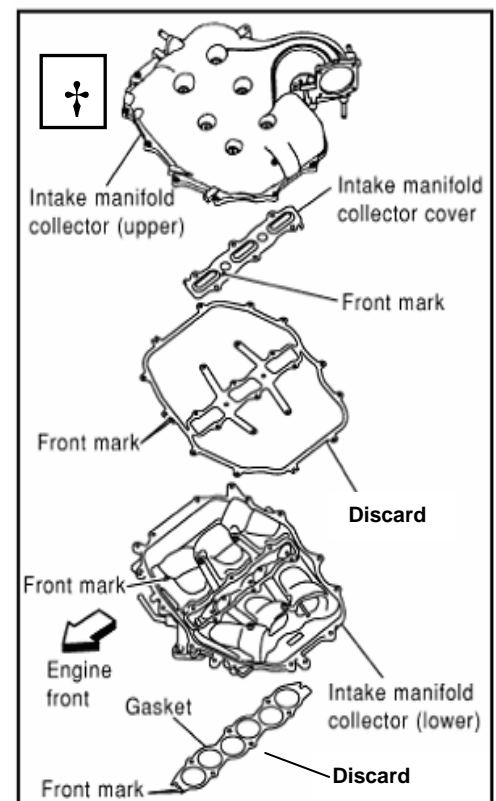
After cleaning, leave the upper plenum set it aside to allow room for removal of the lower plenum and installation of the Iso Thermal gasket. (Iso Thermal and MREV2 only)

Lower Manifold Iso Thermal Gasket Installation:
 For Iso Thermal gasket installation: Unbolt the upper and lower plenum to install the Iso Thermal gasket. *Unbolt the lower collector in the order shown below. Then remove the various bolts and brackets around the perimeter. Then remove and discard the stock manifold gasket and immediately cover the manifold ports with clean rags to prevent anything from falling into the engine.

Before installing the thermal isolating gasket, thoroughly coat it with a thin layer of motor oil. You can do this by adding a few tablespoons of motor oil to the gaskets plastic bag and rubbing it around. When the gasket is heated by the engine, the gasket will absorb the oil and swell. This helps to insure good sealing even if there are mounting surface irregularities.



* Lower Plenum Torque sequence.





If you are installing a MREV2 first clean it of any debris or dust, then replace the old lower collector with the MREV2. Verify correct orientation of the gasket when it is placed on the intake manifold then install the lower plenum assembly.

VERY IMPORTANT

Familiarize yourself with the torque wrench operation before tightening any bolts.

Practice at different torque levels on bolts not related to your car.

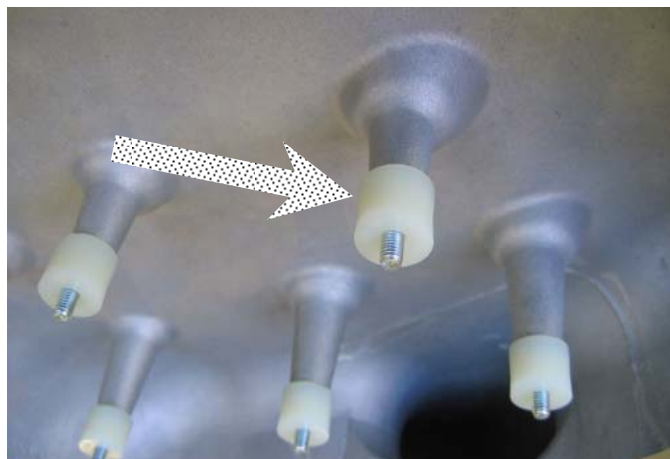
And be sure to use INCH-POUNDS. (Do NOT use foot-pounds)

Progressively torque the lower plenum bolts to 40 **inch**-lbs torque in the order as shown on page 3. Then *torque to 80 **inch**-lbs in the order as shown on page 3. Then re-torque the bolts to 100 **inch**-lbs torque in the order as shown on page 3. The progressive tightening sequence will help insure compressive force is evenly distributed on the sealing surfaces. Note: 100 inch-lbs is only a small amount of force.

Upper plenum installation (all versions):

Lay the aluminum spacer on top of the plenum to find the correct orientation. Then lift the plenum enough to slide the spacer in.

Thread washers onto every supplied bolt. Using the supplied bolts as a guide, snap in the plenum internal spacers to the 6 posts with their cup side facing up. The bottom of the plenum post will nest into the cup. If the spacers are installed upside down the upper plenum will not come to rest against the lower plenum.



Installing the Copper Throttle Body Heater (for Copper upgrades only)

If you are installing the Copper TB Heater, unplug the throttle body harness from the throttle body and remove the plenum entirely.

Set the upper plenum down on a rigid surface where you can unbolt the throttlebody. The throttle body bolts will be very tight so you want to use a good quality metric Allen wrench when removing them.



Hardware Assembly Installation Order:

- 1) Upper Plenum
- 2) Copper TB Heater with the rubber side facing the plenum.
- 3) Nissan metal gasket.
- 4) Throttle Body.
- 5) Throttle Body bolts.

Assemble and screw down the bolts only finger tight before the final torque sequence.

Make sure the rubber side (cool side) of the copper heater is facing the plenum. The bare copper (hot side) must face toward the throttle body. Then place the gasket between the bare copper and the throttle body. This will insure a good seal and high heat flux into the TB.

When reassembling, tighten all the bolts to 10 inch pounds, then tighten to 30 inch pounds, then the final tightening to 60 inch pounds. After assembly, connect the water hoses that were previously going to the plenum and connect them to the copper TB heater. The hose/nipple connection will be tight for a good seal.

Important: Do not push on the throttle body butterfly valve. It has sensitive calibrated electronics connected within the mechanism. If calibration is lost, it can cause a rough idle and require a pedal reset / idle re-learning procedure. The pedal reset procedure is described on the back page of this manual.

Installing new plenum bolts (plenum spacers only):

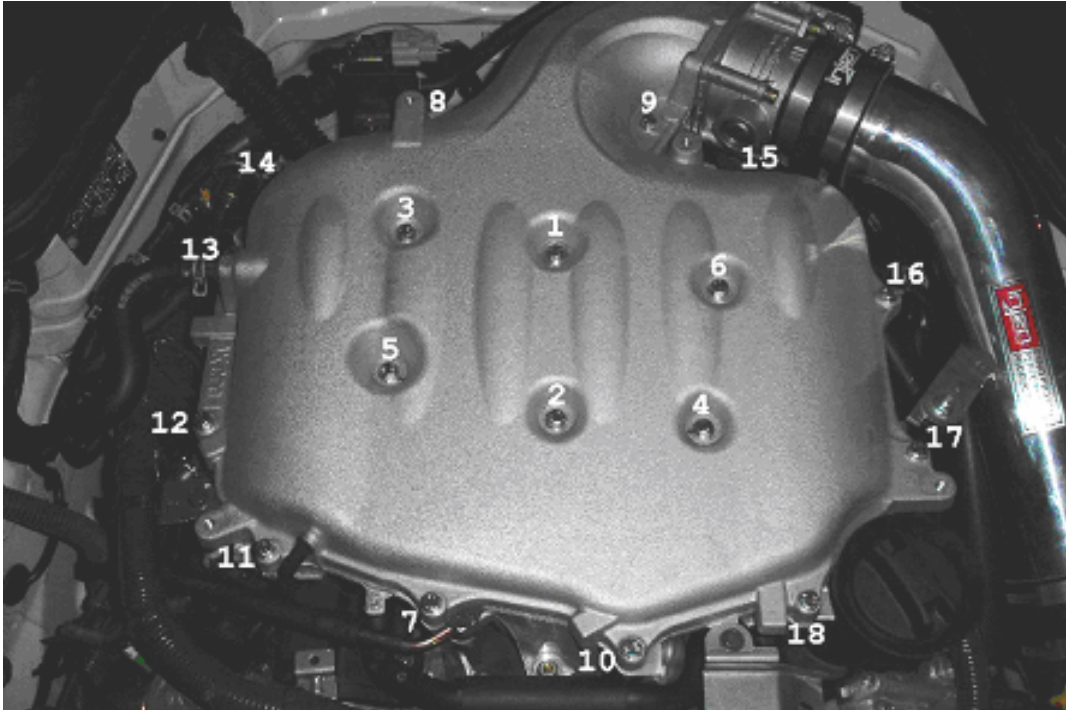
Then install all the bolts with the washer's finger tight per page 7. The long bolts go in 9, 3, 1 and 6. Medium bolts go into 5, 2 and 4. The short bolts go into the plenums outer perimeter, also replacing the guide pins.

Clean bolts 1 through 6 and add 1 drop of Loctite thread locker only to the tip of each shortly before threading them in. Once the plenum is bolted down finger tight, tighten all the bolts to *40 **Inch-lbs** in the numerical order shown on the following page. Then torque all the bolts to *80 **Inch-lbs**. Then re-torque bolts (7 through 18) to *100 **Inch-lbs**. The progressive tightening sequence will help insure force is distributed evenly across the plenum. After it is all bolted down you will never need to tighten the bolts again. After a few thermal cycles the gaskets will settle in for a good seal and the bolts will relax their tension a bit. This is normal and a re-torquing of the bolts is not necessary.

If you are using another manufacturer's plenum mod, use their specified torque sequence and values.

If you do not own, or are not familiar with your torque wrench, use a nut driver to install the bolts. A nut driver is a safe and reliable alternative to a torque wrench.

Never use a regular socket wrench. It is too easy to over torque the plenum threads or bolts. 100 **Inch**-lbs torque isn't much force at all.



Although a progressive tightening sequence takes more time, it is a good practice that can be used on most assemblies requiring tightening of many bolts.



If you don't have a torque wrench, borrow one from Pep Boys or a local auto part store. They will sometimes loan them with a small deposit.

If you can't borrow one, a safe alternative is to hand tighten the bolts with a 10mm socket on a nut driver.

When using leather gloves, this will safely limit the amount of force that can be applied by hand to about 90 **Inch**-lbs.

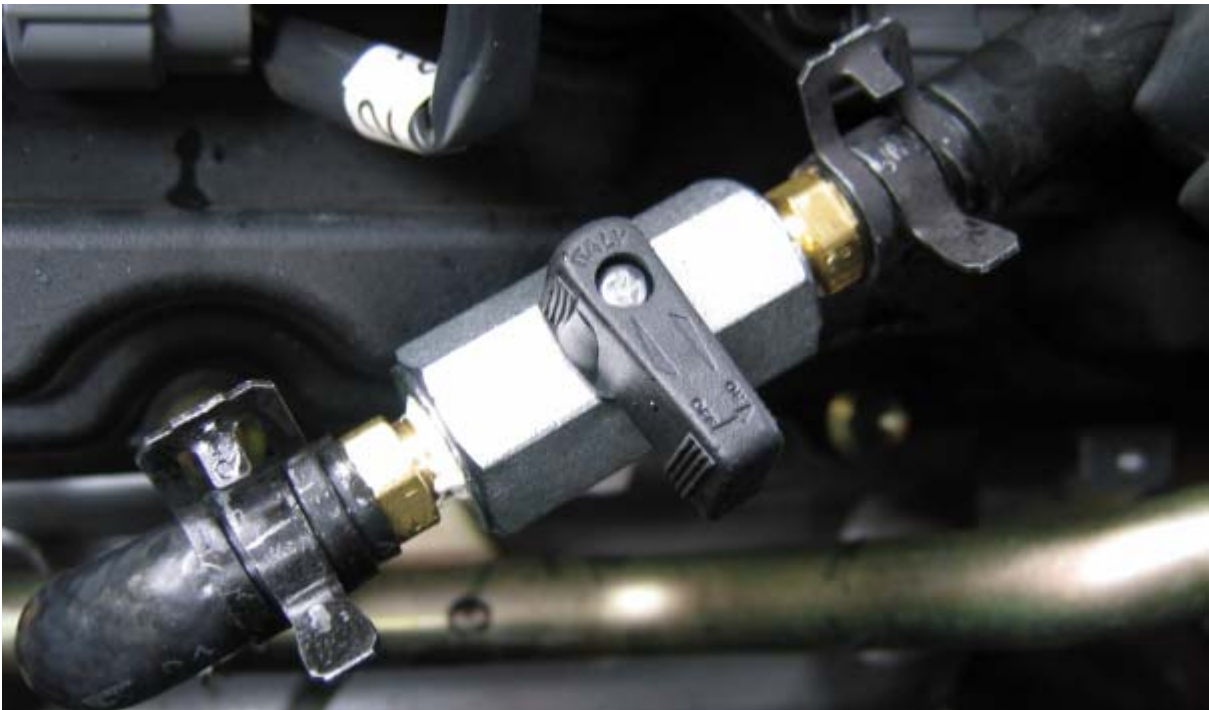
*Note: To convert inch-pounds to foot-pounds, simply divide by 12 inches to convert to feet.

Coolant Control Valve Installation:

Cut out a 1.5" segment of hose as shown below to make room for installation of the coolant control valve.
Note: Some people with leased vehicles may prefer to skip the CCV and install only the copper.



Then install the valve as shown below. The threaded fittings should be sealed with Teflon pipe thread putty or Silicone RTV for a good seal. The valve may also be painted black to reduce its visibility. The valve should be mounted facing up and slightly outward so it can be adjusted.



When installed the valve will be hidden under the air intake tube and will have just enough access for manual adjustment. The valve as shown above is in its closed position. The flow is shut off when the handle is perpendicular to the valve body. Conversely, it is open when the handle is parallel to the valve body. For best performance, the valve should remain closed when ambient atmospheric temperatures are above 55°F but it should always be opened at temperatures of 55°F or lower.

IMPORTANT: After installation of the Copper TB heater or Coolant Control Valve, do not start the engine without first verifying all the coolant hoses are properly connected, leak tight and secured.

Reconnecting the air intake tube to the throttle body:

Reconnect the oil vapor line and gently push the air intake tube back onto the throttle body and MAF. Realign and tighten all the clamps.

Reconnect the vacuum line on the battery side of plenum

Push the hose back on and use pliers to squeeze the clamp and move it back to its original position. Turn the prongs of the hose clamp downward to avoid letting it touch the hood.

Plenum vacuum leak check:

Reconnect the battery negative terminal. Start the engine and let it idle. There should be no new hissing or buzzing sounds. Engine should idle smoothly. One of the most common causes of an air leak is the rubber oil fill spout getting stuck between the plenum and spacer, or a vacuum hose that is not reconnected. Another is when a piece of the stock gasket is accidentally bent or folded over upon itself.

Replace the engine cover:

Replace the engine cover and align it with the bolt holes and studs. Replace the 2x10mm head nuts and 2x10mm head bolts. The engine cover never needs to be cut.

Strut Bar Reinstallation and Adjustment for 350Z:

Place one strut bar spacer on each of the strut bar studs then place the strut bar on. Starting at one side, lift the strut bar bracket just enough to slide in the other three strut bar spacers. When you see the center of the spacer is aligned under the bracket, drop in the bolts and screw them in finger tight. Repeat on the opposite strut bar bracket then tighten down all the bolts. For the two nuts 20 ft-lb; and for the six bolts 24 ft-lb.

Loosen the strut bar jam nuts and turn the center bolt 1.7 turns to adjust clearance between the strut bar and plenum. The strut bar tension may need to be adjusted further to accommodate a good fit. After adjustments have been made, re-tighten jam nuts to lock the center bolt in position. If you notice the plenum comes in contact with the strut bar, use the 4 extra strut bar washers provided. Place them underneath the driver side strut bar bracket for additional clearance. Then re-adjust the strut bar tension as needed.

Verify plenum and strut bar clearance with the hood before proceeding.



Congratulations! You are finished with a stealthy, high performance upgrade!

For installation questions feel free to contact Motordyne or your Motordyne dealer:

Motordyne Engineering (661) 993-5111

Info@MotordyneEngineering.com

Resetting The ECU (this step is not required)

ECU Accelerator Pedal Reset Procedure

Note: Timing is critical for this to work!

1. Turn the ignition switch to on. Dash gauges lit. Don't start the engine!
2. Wait 3 seconds.
3. Fully depress and release the accelerator pedal 5 times within 5 seconds.
4. Wait 7 to 10 seconds.
5. Fully depress the accelerator pedal for approximately 10 seconds. At this point the check engine light starts to blink quickly indicating Diagnostic Test Mode II (Self-diagnostic results) has started.
6. Release accelerator pedal and wait 5 to 10 seconds.
7. Fully depress the accelerator pedal for 10 seconds. At this point the check engine light should change to blinking slowly indicating "Erasing ECU Memory".
8. Release the accelerator pedal and turn the ignition switch to off.
9. Restart the engine. The check engine light should be out.

Note: If the check engine light doesn't blink as described in steps 5 & 7, then the ECU isn't reset.

* If above didn't work, disconnect the battery negative and pump the brake to discharge the ECU capacitors. This method is almost foolproof as long as all ECU control parameters are within their normal ranges.

Resetting The Throttle Body (this step is conditional)

A Rough Idle or a SES can sometimes be caused by a change in the throttle body position sensor calibration. To correct any changes in throttle body calibration, use these procedures to recalibrate.

Accelerator Pedal Release Position Learning Procedure.

1. Make sure that the accelerator pedal is fully released.
2. Turn ignition switch "ON" and wait at least 2 seconds.
3. Turn ignition switch "OFF" wait at least 10 seconds.
4. Turn ignition switch "ON" and wait at least 2 seconds.
5. Turn ignition switch "OFF" wait at least 10 seconds.

Throttle Valve Closed Position Learning

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch is "ON".
3. Turn ignition switch is "OFF" wait at least 10 seconds.

Make sure that the throttle valve moves during above 10 seconds by confirming the operating sound.

Idle Air Volume Learning (Throttle Position Learning)

It's best to time with a watch/clock.

1. Perform "Accelerator Pedal Released Position Learning".
2. Perform "Throttle Valve Closed Position Learning".
3. Start engine and warm it up to normal operating temperature.
4. Turn ignition switch "OFF" and wait at least 10 seconds.
5. Confirm that accelerator pedal is fully released, turn ignition switch "ON" and wait 3 seconds.
6. Repeat the following (steps 7a, 7b) procedures quickly five times within 5 seconds.
 - 7a. Fully depress the accelerator pedal (HARD)
 - 7b. Fully release the accelerator pedal.
8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the Check Engine Light (CEL) stops blinking and turned ON.
9. Fully release the accelerator pedal within 3 seconds after the CEL is ON.
10. Start engine and let it idle.
11. Wait 20 seconds.
12. Rev up the engine two or three times and make sure the idle speed and ignition timing are within the specifications.