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Installation instructions for Quick-Change Oil Filter relocater for NB (1999+) Miatas (MX-5) W/Stainless steel hoses

Before beginning, get your car up where you have access to the undercarriage (Rhino Ramps work well). Tools you will need: Metric sockets and extensions (specifically 10mm, 14mm), Mazda oil filter wrench, 13/16", & 7/8" combination or open-end wrenches (**short-handled wrenches are highly recommended**), center-punch, hammer, electric drill and 1/4" drill bit. Other helpful but not necessary tools: torque wrench, file.

- 1) Remove shroud from bottom of engine compartment (eleven 10 MM bolts). Remove cast aluminum support bracket that is attached to the block and to the intake manifold (three 14 MM bolts; 2 from the top, 1 from the bottom). This is to give you access to your work area – both will of course be replaced later.

***TIP:** Remove the top two 14mm bolts from the support bracket first, then remove the bottom bolt and remove the aluminum bracket from under the car.*



- 2) Remove oil filter. Note: it is not necessary to drain the oil from the pan before removing the filter, but this is a good time to also do an oil change.

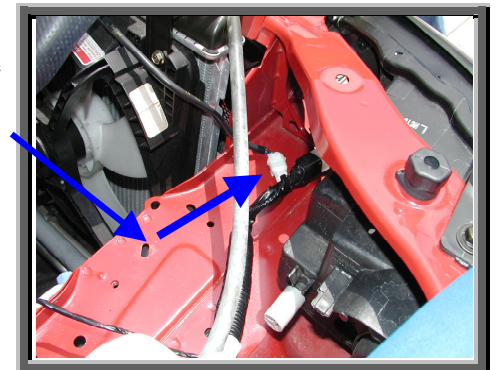
***TIP:** You may want to use a small dish to catch oil drips from the filter. I use a plastic Cool-Whip dish. Unscrew the filter, and drop it into the dish. Prop the dish on the cross member until the oil ceases to drip.*



INSTALL BASE UNIT:

- 1) Remove white push-in connector for radiator fan wire from open space inside engine bay on passenger side. Just reposition it forward beside the headlight. There is another slot that can be utilized to relocate this connector more forward of its "stock" location.

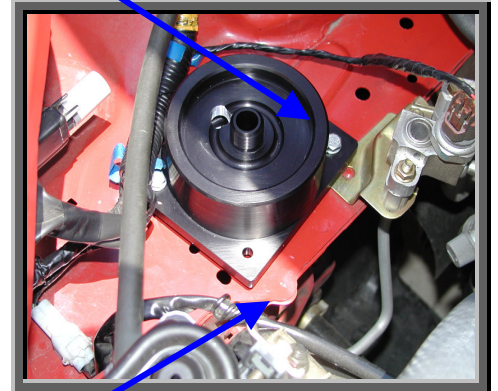
***TIP:** Spread the tabs on bottom a little more open before inserting into new location (it's a fatter slot).*



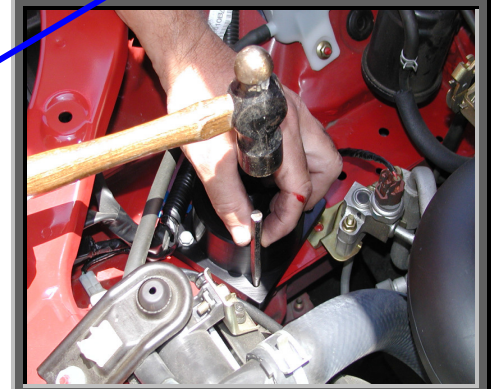


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- 2) Remove existing M6 bolt holding air conditioning site glass. If your car is not equipped with air conditioning, or if you have a '99 or 2000 model there is no bolt - you will see a hole with a threaded nut welded beneath it. This is the initial mounting point for the remote base.
- 3) If you have a '99 or 2000 Congratulations you get to skip the next two steps – you already have this hole. For the rest of you, attach one corner of your relocater base unit using M6 x 30mm bolt and washer supplied with your kit (you may discard the bolt you removed – it is too short to re-use). Insert one of the thick rubber washer isolator mounts between base unit and body. Do not tighten at this time.

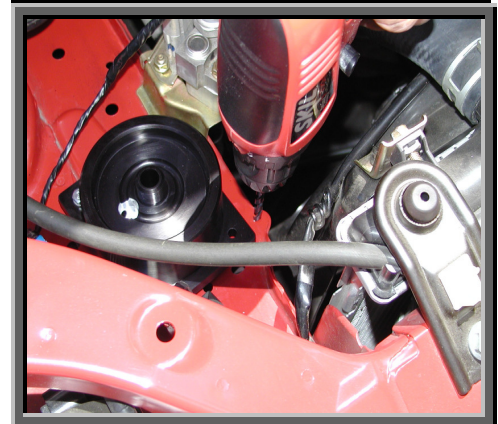


- 4) Next, you are going to drill the 2nd mounting hole (in the tab that sticks out toward the engine). Position your base unit as shown, and using it as a template, center-punch where you will drill the mounting hole in the tab (you can feel the hole that is already there from underneath the tab). *Note: on '99 & 2000 cars this hole is already there – lucky you, no drilling required!*



- 5) Drill 1/4" hole through. Insert 2nd M6 x 30mm bolt with washer, add 2nd rubber isolator mount (thick rubber washer) between base unit and body, and secure with Nyloc[®] nut and flat washer at bottom. *TIP: Hold a moistened (with water) paper towel or cloth under the tab when drilling the hole – this will catch the drill bit chips.*

Snug both bolts down but **do not over tighten**. You only want the bolts slightly snug, there is no stress on them, and you do **not** want to fully compress the rubber mounts. You may install your oil filter to the base at this time. Follow normal installation procedures for installing your filter.





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INSTALL FILTER REPLACEMENT (adapter) UNIT:

- 1) Check that the O-ring is properly inserted into groove in the filter replacement unit, apply a small amount of oil to the surface of the O-ring and screw on just as you would a filter. Tighten securely with your standard oil filter wrench. Tighten about $\frac{3}{4}$ turn after contacting surface, then position holes as close to vertical as possible – unlike installing a filter, this is a more permanent installation, you can crank it down pretty tight.

The additional O-ring supplied with your kit is a spare. I recommend changing the O-ring on your adapter when you change timing belts (~ 60,000 miles).

TIP: For best routing of hoses, position outer most hole either between 5 & 7 o'clock position or between 11 & 1 o'clock position - so the center hose will not end-up too close to the intake support bracket. (see page 6)



INSTALL THE HOSES:

- 1) Apply Permatex high-temperature thread sealant to the threads of each hose assembly about two threads back from end. Do not get sealant on the end of the thread where it might enter the inside of the hose. Use a **small amount**; a little goes a long way. Excess thread sealant will only build-up on the outside of the hole. But make certain you have sealant all the way around and in at least two thread “valleys”.

TIP: Use a toothpick to help spread the sealant around the periphery of the thread. **Note:** be sure to “knead” the Permatex tube before using to make certain the sealant is mixed.



- 2) For this part of the install you will need an assistant twisting the hose (clockwise) from up top while you guide the threaded fitting into the adapter from under the car. Install the shorter of the two hoses to the center-most hole on the filter adapter, the longer one to the outside hole. The thread is a pipe thread, so it will start easily **when you have it square with the hole**. Tighten securely, but **do not over tighten** (7/8” open-end wrench).

TIP: Start with the hole that is farthest from you i.e. closest to the top. Remember: shorter hose in the center hole, longer one in the outside hole.



- 3) After tightening both hoses, route them up to the base unit.

TIP: You may want to temporarily lift the emission catch tank out of its V- groove mount to provide more room to route the hoses. Replace the tank in its mount once the hoses have been installed.





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- 4) Install hose protector to the hose closest to the outside/bottom. Start by spreading one of the spirals in the middle of the hose protector, and place over hose at an angle. Then either wrap the remainder or twist it into place. Once on the hose you can slide it to the proper location. Put hose protector anywhere you think there is a possibility of abrasion from the hose. Refer to "Caution" sheet for more information about protecting A/C lines from chafing by SS braid.

***TIP:** You can cut the hose protector with a PVC pipe cutter if you have one, or with a sharp knife if you don't.*

- 5) Attach the center hose from the filter unit to the tapered adapter (AN) fitting in the center hole on the base unit. Thread sealant is **not** needed here, as this is a compression type fitting. Tighten securely (7/8" open-end wrench). NOTE: refer to chart on page 5 labeled "Torque Specifications for Aluminum Fittings" for proper tightening instructions.

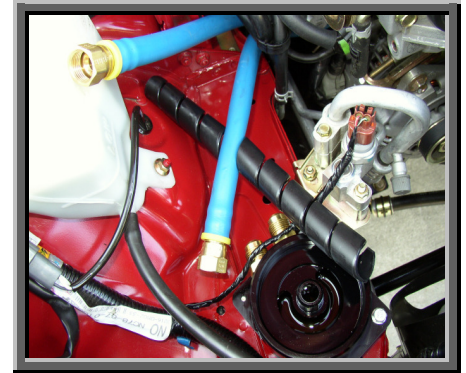
***TIP:** A short handled wrench works best here.*

- 6) Attach outside hose to remaining fitting as above. **Make certain you do not cross the hoses – center to center, outside to outside.** Install oil filter to base unit per instructions on filter. Start engine and check for leaks.

***TIP:** If you do not have oil pressure within a few seconds, turn off the ignition and check to be certain you didn't cross the hoses.*

- 7) Replace support bracket & bottom shroud under engine. Check oil level – correct as necessary.

***TIP:** If your support bracket has large (mold) parting lines you might want to consider filing them off (while you've got it out of the car) to prevent any possible irritation to the hoses. Just a light pass with a single cut mill bastard file will do the trick.*



Do not cross hoses – center to center, outside to outside



YOU'RE DONE!

Go have a great Miata day, knowing that your next oil change will take less than 25 minutes!



ZOOM-ZOOM



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Please refer to the table below for instructions on how to tighten –08 aluminum ‘swivel’ fittings to tapered ‘AN’ connectors (outlined section for -08):

Torque Specifications for Aluminum Fittings

One of the most frequently asked questions is how tight should the connection between the fitting and the adapter be?

The correct answer is to follow the specification guidelines listed below. This will give the proper tightness to allow for a good seal, but prevents damage to the fitting by over torque.

TORQUE SPECIFICATION GUIDELINES

Nut Size	Minimum Torque ¹	Maximum Torque ¹
-02	50	80
-03	70	105
-04	100	140
-05	130	180
-06	150	195
-08	270	350
-10	360	430
-12	460	550
-16	700	840
-20	850	1020
-24	900	1080
-32	1800	2000

¹Torque values are shown in inch pounds for aluminum fittings.

There may be times when the correct torque wrench may not be available. In these cases you can follow one of the alternate tightening methods listed at right. **Please note that these methods are for aluminum performance fittings and adapters.** See Bulletin JA14A for steel fittings.

Remember, overtightening will result in possible damage to the fitting, resulting in possible leaks.

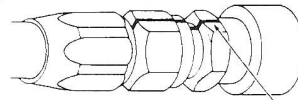
ALTERNATE TIGHTENING METHOD ONE

Flats Method

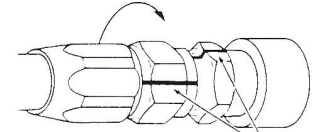
Here are the steps for an excellent method of tightening. Anyone can tell if the joint was tightened and how much.

1. Tighten the nut by hand until it bottoms the seats.
2. Using a marker, draw a line lengthwise on the nut and extend it onto the adapter.
3. Using a wrench, rotate the nut to tighten. Turn the nut the amount shown on the chart.

Size	Number of Hex Flats Rotations
-04	1-1/2 to 1-3/4
-06	1 to 1-1/2
-08	1-1/4 to 1-3/4
-10	1-1/4 to 1-3/4
-12	1 to 1-1/2
-16	3/4 to 1
-20	1/2 to 3/4
-24	1/2 to 3/4



Mark a line on the nut and adapter before torquing.



Misalignment of the mark shows the amount which the nut was tightened.

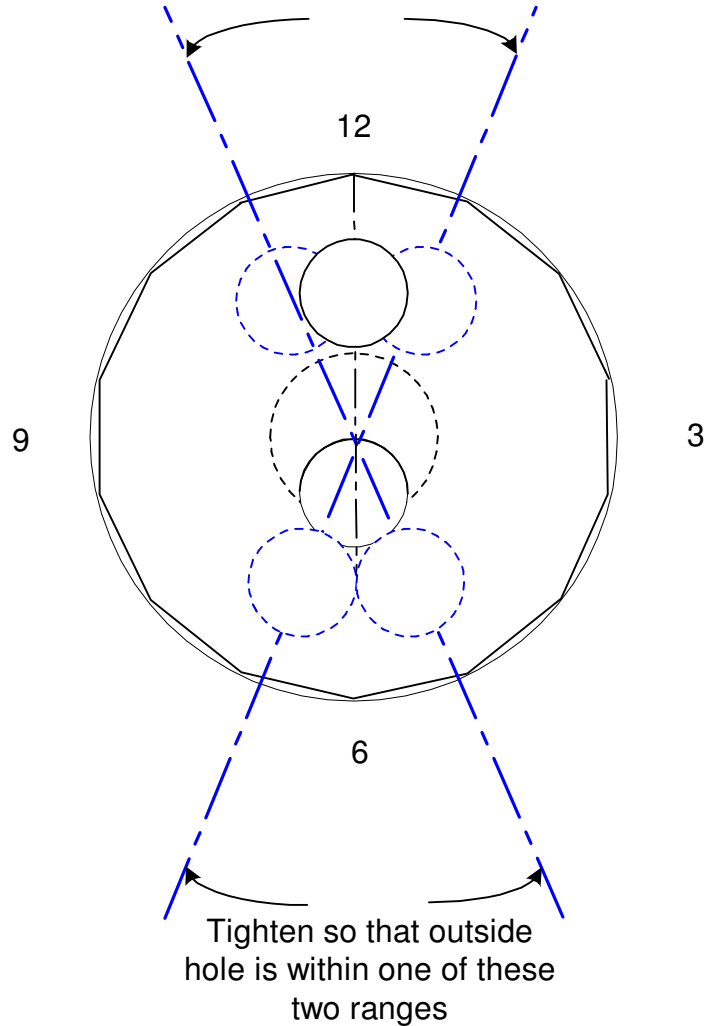
Alternate Tightening Method Two

The second alternate method of tightening is very simple and easy to remember. Bring the nut to hand tight and then rotate a quarter of a turn. This applies to all sizes. Mark the fitting as indicated in the flat method to confirm the quarter turn.



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Tighten so that outside hole is within one of these two ranges



When tightening the adapter to the mounting position on the block (where the filter used to be) position the outer-most of the two holes in position as depicted above; that is in either of the two ranges 5 to 7 OR 11 to 1 o'clock positions. The “ideal” position is vertical (12 & 6).

Doing so will allow more clearance for the hoses to pass by the aluminum support bracket when it is reinstalled later.