Mazda RX8 Pulling the Engine

Foreword

This document is a personal log of my engine removal and rebuild process on a 2004 right-hand drive Mazda RX-8. I created it to help myself stay organized, remember what I did, and possibly help others doing similar work. It is written from a first-time rebuilder's perspective and includes both the steps I followed and the lessons I learned — including mistakes.

If you're attempting something similar, I hope this documentation saves you time and gives you a more confident starting point.

Disclaimer

1. This is not a professional guide — it's a personal documentation of how I removed and plan to rebuild my RX-8 engine. It is shared as-is for informational purposes.

2. I am not a certified mechanic. This was my first time doing a rotary rebuild (in 2025), and while I've done my best to double-check everything. Mistakes, omissions, or inefficiencies may exist.

3. I'm a mechanical engineer by trade, so I love research and precision — but that doesn't mean I know everything. I've tried to approach this project with curiosity, patience, and a healthy amount of paranoia.

4. The car used is a 2004 RHD RX-8, which is mostly the same as LHD cars, with mirrored layouts.

5. Use this document at your own risk. Always cross-reference with other trusted sources: workshop manuals, YouTube tutorials, professional guides, and verified forum posts.

6. Some steps may vary depending on your region, tools, or model year.

7. Safety is your responsibility. Use proper equipment, support the car and engine securely, and avoid rushing.

Useful Websites

Here are some websites I personally used during my RX-8 rebuild. Some offer information and tutorials, others specialize in OEM or aftermarket parts. Depending on your location, not all may ship internationally.

Parts & Rebuild Kits

- Atkins Rotary – OEM and aftermarket parts, rebuild kits, guides
- Ryan Rotary Performance – UK-based parts, rebuild kits, technical content
- Rotary Aviation – Engine parts, rebuild kits, technical info
- Rotary Performance – Parts, tech articles, rebuild services
- Wankelshop – German rotary shop with tuning and rebuild kits
- Mazdatrix – Wide range of OEM/aftermarket rotary parts
- Essex Rotary – UK-based store with various RX-8 components
- Rotary Bum – Parts for street and race builds
- Yoshi Parts – Catalogs, parts diagrams, and rebuild supplies

Guides & Technical Info

- Epitroch – Sohn adapter details and guides
- Driven By Madness – Guides, spreadsheets, and useful documents
- Foxed.ca – Digital workshop manual PDFs

Forums & Communities

- RX8Club – The go-to RX-8 forum, with PDF guides and community support
- Svenska Wankel Registret (SWR) – Swedish rotary community
- Superior Imports – Swedish importer with forum and service shop

Shops & Services

- Rotor Shop – EU-based service & rebuild shop
- Rotary Sweden – Sweden-based service & rebuild shop

Useful Youtube Channels

Hands-On Rotary Content

- @FixYOURride13 – Straightforward, no-nonsense rebuild walkthroughs
- @RADPotential – Deep dives into rotary theory and diagnostics (highly recommended)
- @JapandaTuning – Solid how-tos and engine pulling guides
- @joemaddoxrx7 – Rotary-focused channel with real-world engine tips
- @I_Do_Cars – General engine teardown videos including RX-8 content

Performance & Tuning

- @RobDahm – Extreme rotary builds, but includes useful insights on durability and upgrades
- @fullboost – Dyno tests, exhaust comparisons, and rotary performance showcases
- @Bbeavis – Tuning and wiring insights with rotary applications
- @motoiq – Engineering-heavy content, including RX-8 cooling and chassis breakdowns

General Automotive Learning

- @CarThrottle – RX-8 ownership stories, budget builds, and engine feature videos
- @speedacademy – Covers various platforms but offers solid engine swap logic
- @HGVHarry – More general repairs, but has helpful mechanical methods

You can find most rebuild-specific videos by searching:

> `"rx8 engine rebuild site:youtube.com"`
> Or add specific parts: `"rx8 compression test"`, `"rx8 rebuild tips"`, etc.

Notes

A few miscellaneous but useful things I learned or researched during the rebuild. Some from forums, other from books (For example “Street Rotary HP1549” by Mark Warner, HIGHLY recommend)

Apex & Side Seals

- Hard apex seals seal well, but are brittle. Even minor detonations can destroy them.
    - If you want something more street-friendly, check out PowerSeals (Australia) — their “street seals” are a softer alternative.

- Stick to the OEM apex seal thickness unless you know what you’re doing.

- Side seals often wear out first due to the location of the exhaust port (on the side housing).

Spark Plugs

- There are hot and cold spark plugs.

- Rotaries love cold plugs (e.g., NGK BUR9EQ or equivalent).
    - Hotter plugs can increase pre-ignition risk, especially at high RPM.

Fluids (OEM or Better Recommended)

- Engine oil: Idemitsu 10W-30 Synthetic (or equivalent rotary-specific oil)

- Sohn reservoir: Idemitsu Premix

- Premix: Idemitsu premix or Pettit Racing Protek-R

- Gearbox/Differential oil: Idemitsu gear oil (75W-90)

Suspension & Cross-Compatibility

- Some MX-5 NC suspension parts are compatible with the RX-8 (aftermarket).

- Useful to know when browsing part catalogs or looking for coilovers.

Tires and Rims:

OEM Specs

- **Tire size**: 225/45ZR18
- **Rim size**: 18" diameter × 8" width
- **Offset (ET)**: +50

This setup gives a solid balance between handling and ride comfort. Most aftermarket wheels follow similar sizing but with more aggressive offsets.

Community-Approved Fitments

Here are some sizes that are commonly run by RX-8 owners, based on forum posts and build threads:

- **Front:** 235/45 R18
- **Rear:** 245/45 R18
- Other acceptable ranges:
    - **Width**: 225–245 mm
    - **Profile**: 25–45
    - **Rim size**: 18"

Always check clearance if you're using lower offsets or wider wheels — especially if you're lowered or running aftermarket suspension.

Fitment Tips

- If you're running a **staggered setup**, be aware that the RX-8 was designed around a square setup. Staggering can affect handling balance.

- Use a **fitment calculator** (e.g., WillTheyFit.com) when comparing wheel specs.

- If you're unsure, stick close to OEM specs for daily/street use.

Save or Spend $$

Goal: Build a nice, streetable RX-8 — not a dedicated track car.
This section summarizes what I personally think is worth spending money on, and what you can safely cheap out on (or DIY), based on research and community consensus.

SAVE – Cosmetic & Non-Critical Performance Parts

These parts won't make a huge difference for street driving or engine safety — so you can save money, go budget, or even DIY:

Engine Bay & Intake

- **Intake system**: eBay/AliExpress is fine. Brand-name intakes won't add much unless you're tuned.
- **Air filter**: Just make sure it doesn't fall apart and get sucked into the engine.
- **Catch can**: Cheap Amazon ones work. You can always upgrade later.

Exhaust

- **Cat-back/muffler**: Anything that fits and sounds good to you. Just avoid super restrictive or ultra-light pipes if you're worried about heat.
- **Header wrap / heat shielding**: Budget wraps work well enough.

Cooling / Piping

- **Intercooler & radiator piping**: DIY using silicone bends or cheap aluminum. Don't overthink it.
- **Oil cooler lines (non-track use)**: Can be reused or replaced with basic kits.

Suspension

- **Strut bars**: Don't get scammed into buying "super rigid" $300 bars. Cheap ones help just as much for most driving.
- **Coilovers**: You don't need Öhlins or HKS unless you track hard. Mid-range is fine for street use.
- **Rims**: Replica wheels are usually fine if you check reviews and don't go dirt cheap. Look up actual owner feedback.

Avoid "forum flex" parts

Don't buy stuff just because someone with a bone-stock Civic and a forum signature said it's "the best mod." Use your own judgment — and check real feedback. Most things live long if you do your maintenance.

SPEND – Safety, Tuning & Wear Items

If it affects how the car runs, handles power, or keeps you safe — spend the money here.

Engine Internals / Performance

Clutch & flywheel: If this fails, it can destroy your bellhousing or worse.
Water pump / oil pump: Get OEM or better — don't risk failure.
Radiator: Stock or upgraded, but never neglected.

Fuel System

- Fuel pump
- Injectors
- Fuel pressure regulator

All of these impact tuning stability and engine safety. Buy good stuff.

Brakes & Tires

Pads & rotors: Go OEM or better. Don't cheap out here.
Tires: Probably the most important mod on the car. Never skimp.

Safety Gear

Whether it's harnesses, seats, or even heat shielding — if it affects your safety or peace of mind, spend a little more.

Clearing Engine bay/lifting engine

Notes

Always lube the long tension bolt threads with old motor oil to get the right torque.
Tension bolts should be torqued to 40.67Nm. Torque down in a criss-cross pattern, back and forth.

Before we start

A few tips to keep your sanity intact during the teardown:

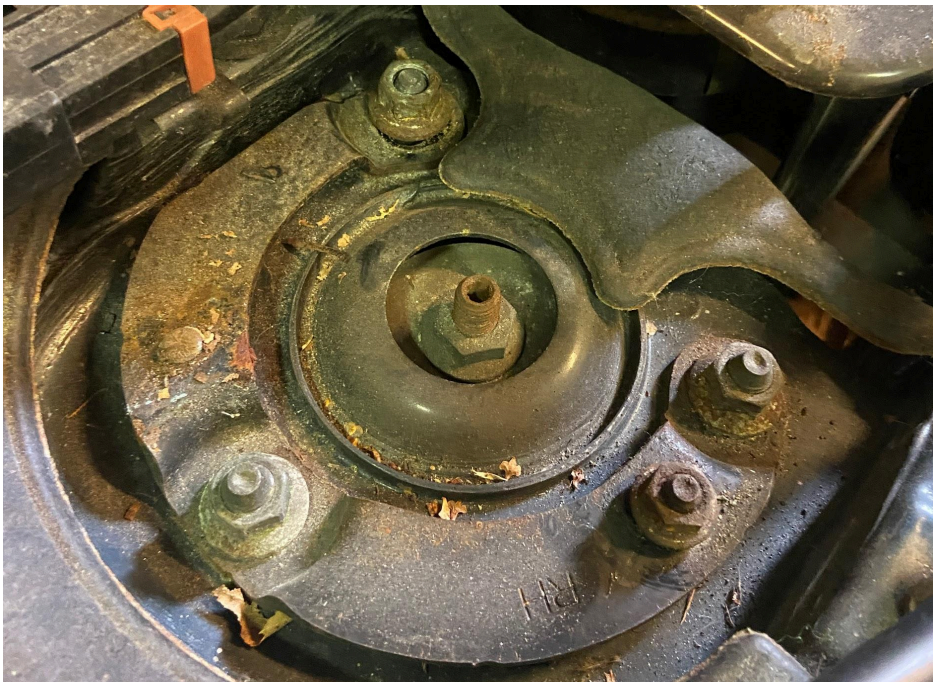
1. **Organize everything.**
    - Use labeled zip bags, masking tape, or bolt trays.
    - I recommend **re-threading bolts/nuts back into their original locations** after removing each part — that way, you'll always know what goes where.
2. **Take pictures.**
    - Your memory will fail you. Your camera won't.
    - Especially important for vacuum lines, wiring harnesses, and sensor connectors.
3. **Label everything.**
    - Use masking tape + a marker. Be specific, not lazy ("top vacuum line near throttle body" > "vac line").
4. **Don't rush.**
    - Getting frustrated usually means it's time for a break or food. Most mistakes happen under pressure or fatigue.

Remove battery

1. Start by loosening the cables to the battery and putting them aside.
2. next. The battery is held down by two hooked metal rods. Loosening the top nuts will allow you to unhook the metal bars on the side of the battery and pull it out, after that you can remove the battery.

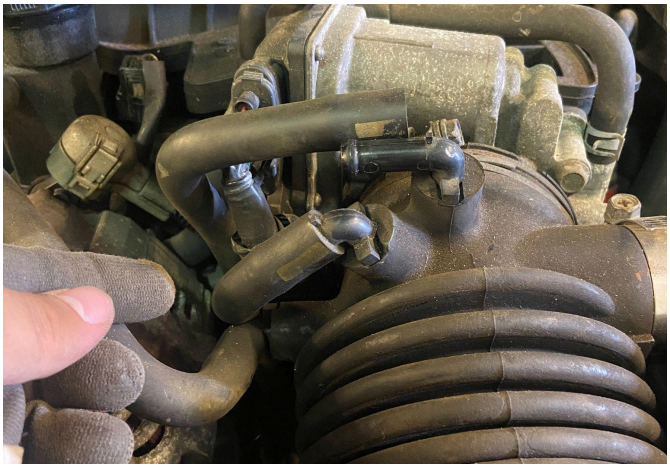
Remove strut bar

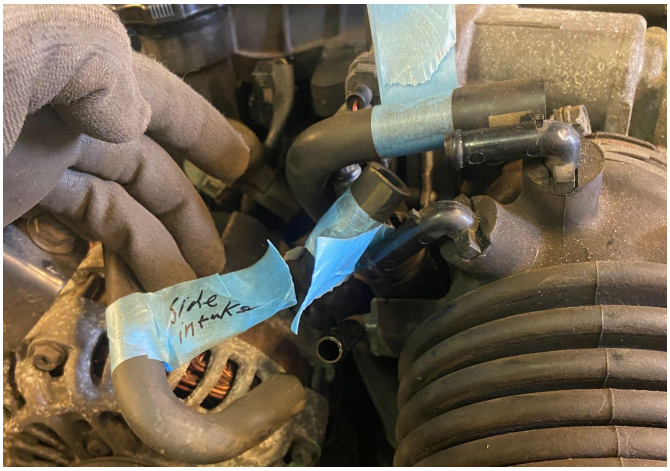
1. The strut bar is held down by 4x 12mm nuts, 2 on each side. Just lift the bar up and put it aside.



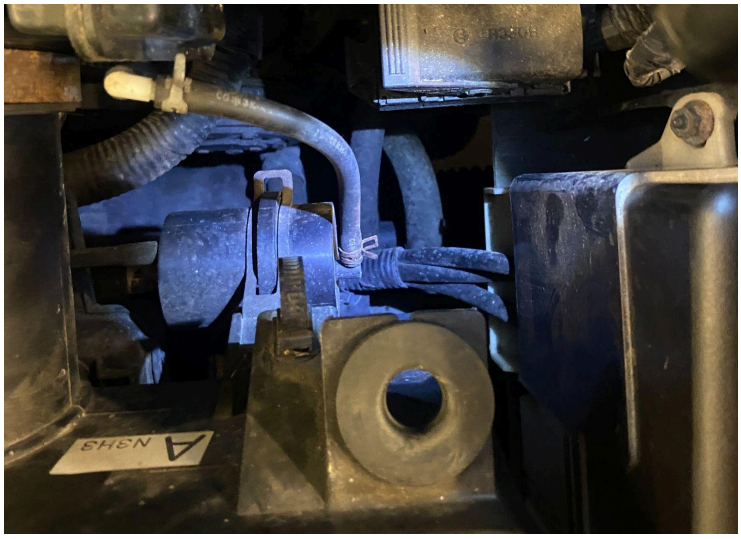
Remove Air Filter Box

1. Disconnecting the 3 breather hoses that are connected to the airbox. I recommend labeling them with top-/mid-/side-intake using some masking tape.



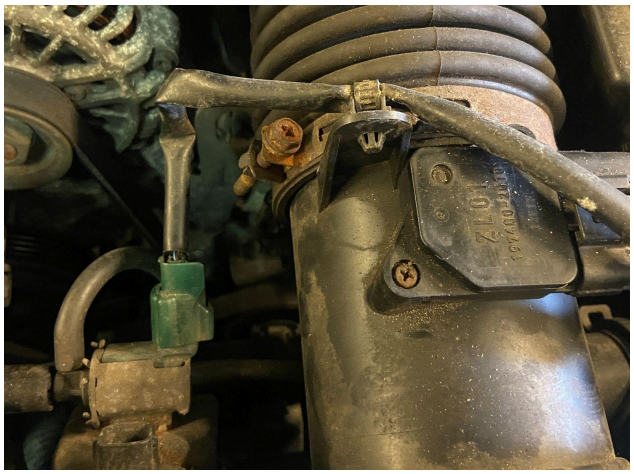


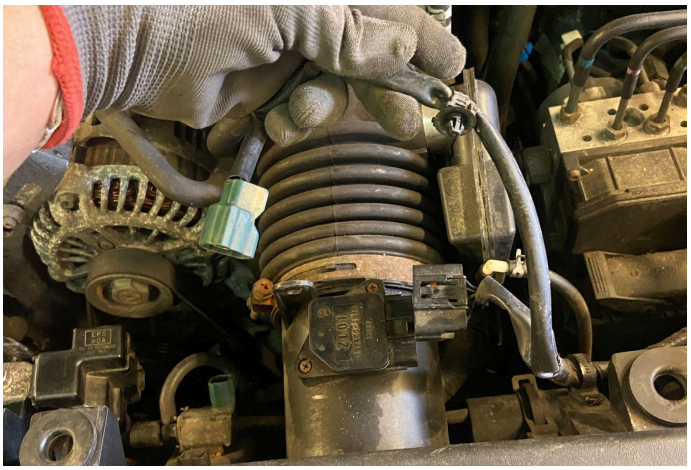
2. Disconnect the vacuum line on the right side below the airbox. Unplug it and remove it from the clips under the black sensor box. Label it and put it aside



3. The last vacuum line is on the left side of the airbox. Unplug this as well.

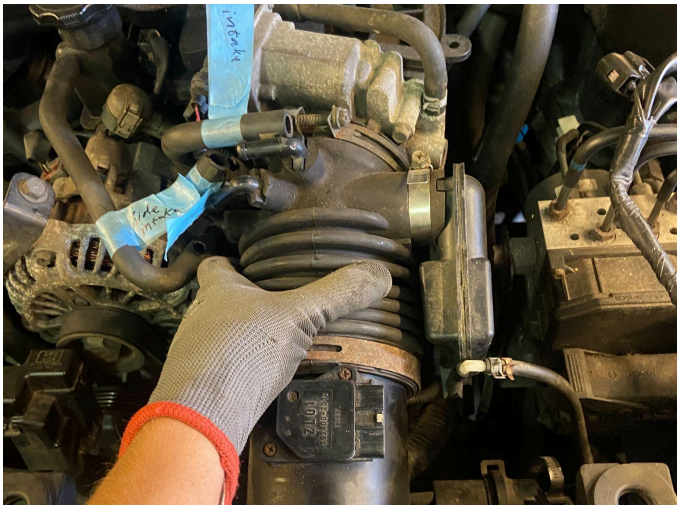
4. Remove the 2 cables going into the airbox/pipe, one green and one black. The cables are held with two clips that you'll have to remove. then put the cables out the way.

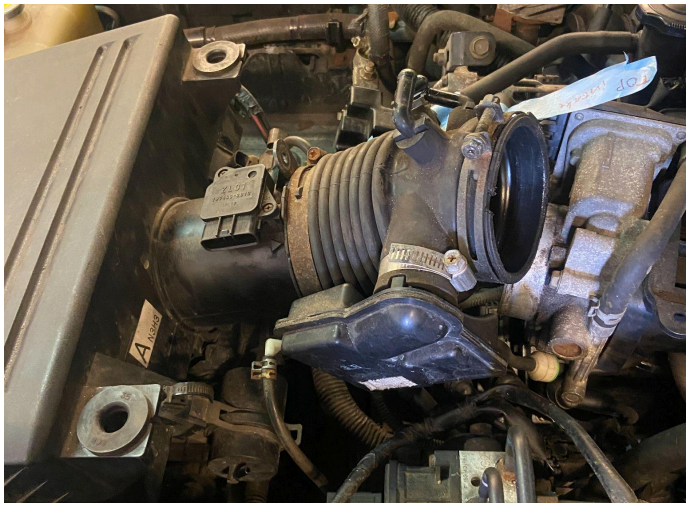




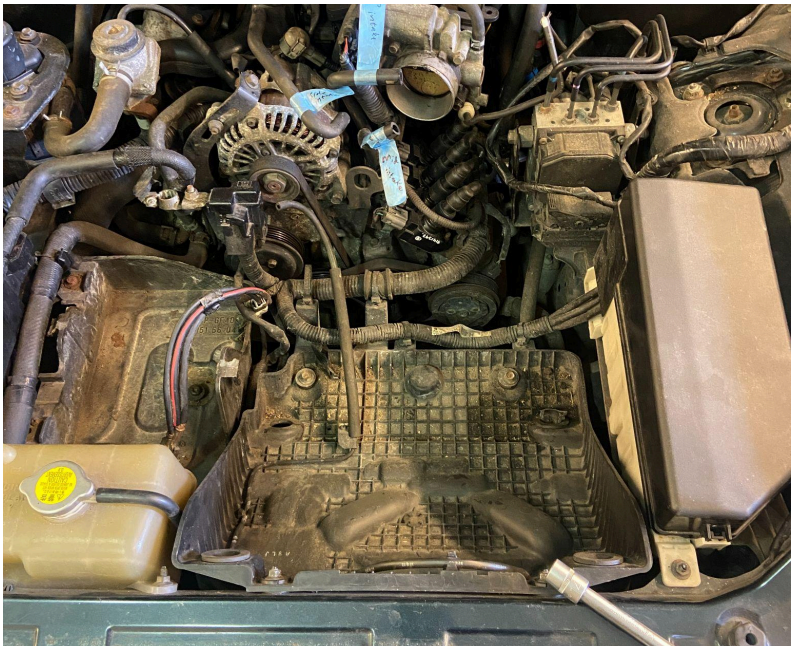
5. Loosen the jubilee clamp closest to the throttle body. Do not unscrew completely, just loosen it.

6. Pull the rubber pipe towards the front of the engine and away from the throttle body so that it “pops out”. Next you can pull the airbox up and slightly towards the windshield to unplug the rubber clips under the airbox.



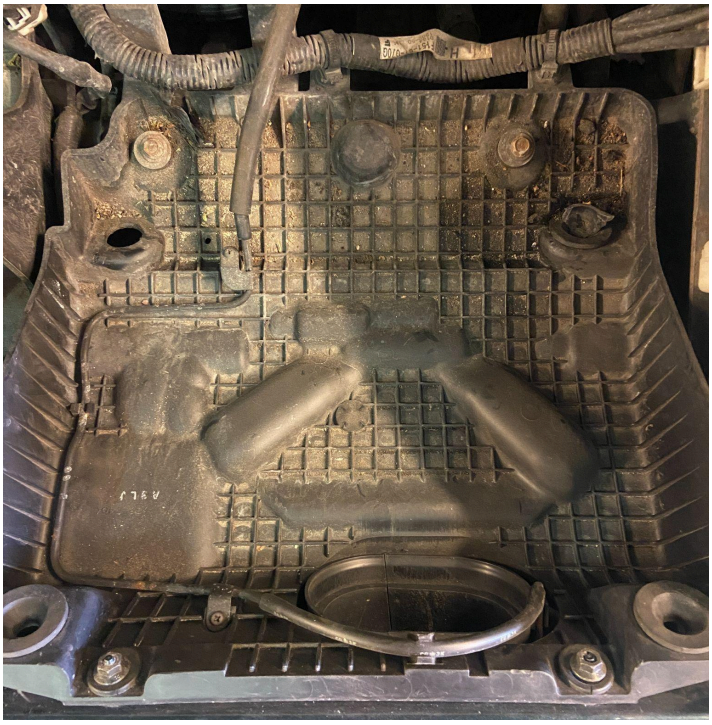


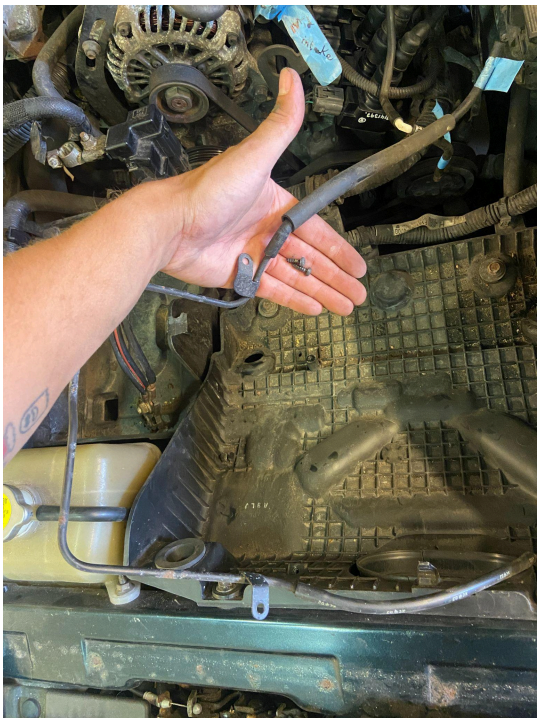
7. Put the airbox aside and label everything.



Remove Air Filter Box Floor

1. Unscrew and unclip the vacuum line.
    a. Unscrew the two clips holding it down using a phillips bit and then gently unclip it from the floor and from the wall closest to the front of the car. **Be careful not to bend the vacuum line as it could crack**.

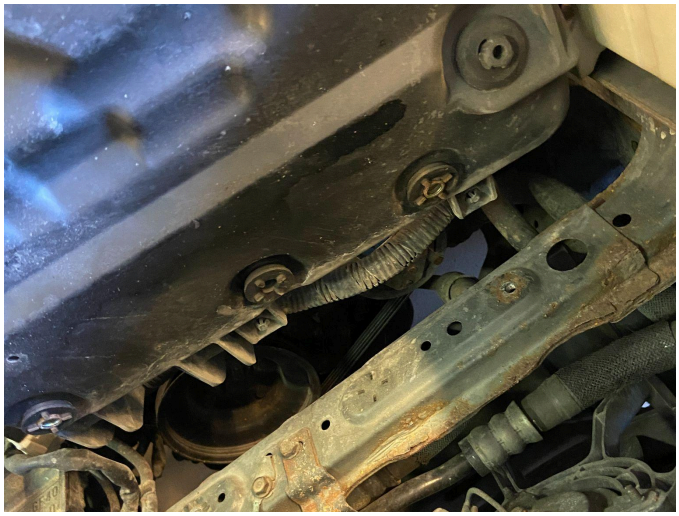




2. Unscrew the rest of the 4x 10mm bolts/nuts remaining bolts/nuts holding the floor.

3. Lift up the plastic and feed the vacuum line through the hole so that it is no longer in the way.

4. Unclip the 4 cable retainers that hold the cables from the battery. Use a rather long flat plier. The clips are on the underside of the box, so lift it up so that you can reach them.



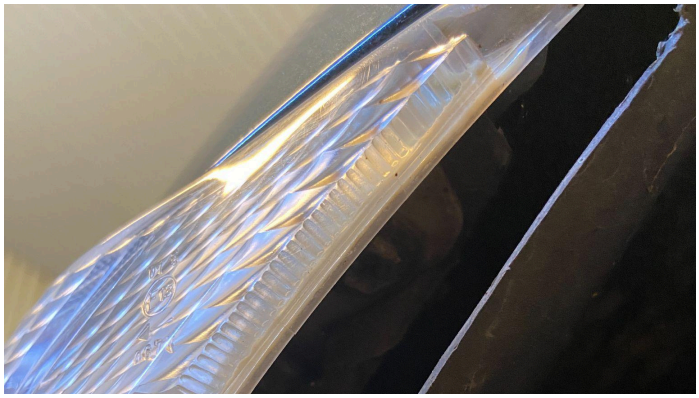
5. You can take out the air filter box floor and put it aside.

Remove Front bumper

In order to remove the risk of scratching the front bumper, I chose to remove it.

1. In each front wheel well, remove 4 plastic clips (twist with Phillips bit, then pry out using preferably a plastic trim removal crowbar.)

2. Gently lift the wheel liner to expose the screw holding the indicator. Unscrew it using a 10mm.



3. Gently pop out the blinker.
    a. Close to where the screw was there is a small hook, be careful not to break it. Since the blinker is ”stuck” to the bumper in the front of it, you want to pull down and out on the side of the blinker closest to the wheel to unclip it before you pull the rest back/out.
    b. NOTE: it is easier if you wait to remove the blinker glass until you have popped out the corners of the bumper so that you can easily reach this small clip.

4. When you get the glass out you will want to twist and pull the blinker out of the glass. You can just let the blinker light hang for now.

5. Remove the screws under the bumper. There are 10 in total. Remove them with a 10mm.

6. The last 4 screws are under the plastic cover at the top of the bumper. To remove the plastic cover you need to unclip 6 plastic clips. I again recommend using a plastic trim removal crowbar so that you don't break them.