

Donor Car Stripping

ENGINE REMOVAL -

Methods & Precautions

Locating a suitable place to work is extremely important while removing the engine and several preliminary steps need to be taken. Storage, along with adequate work space will be required; therefore if a garage or workshop is unattainable, at the very least, you will require a flat, clean, level, work space made from concrete or asphalt. To help keep tools clean and organized, it is always best to clean the engine and engine compartment before starting the removal procedure.

Safety is of the primary importance, considering the many hazards involved in lifting an engine from the vehicle, therefore an engine hoist or A-frame will be necessary, while making sure the equipment is rated in excess of the combined weight of engine and any accessories. If you are a novice, with this being your first time of removing an engine, advice and aid from someone with more experience should be undertaken, as when lifting the engine from the vehicle, one person cannot perform all the tasks required simultaneously.

Allow yourself plenty time, obtaining all the equipment and tools you will be requiring before beginning the job. In addition to an engine hoist, a heavy-duty trolley jack, complete sets of spanners and sockets, along with, wooden blocks, plenty of rags, cleaning solvent, (incase of spilt oil, coolant and fuel), will not only make the removal of the engine safer, but can be done so with relative ease. Serious injury can be a result of many a careless action and even though the engine removal is a major task, it will be accomplished successfully as long as you plan ahead, allowing yourself time in the advent of delays.

WARNING:

The air conditioning system is under high pressure. Always wear protective eyewear when disconnecting the air conditioning system fittings.

CAUTION:

If removing the M40 engine do not turn the engine upside down for any longer than 10 minutes, this is very important, since it is possible for the oil to drain out of the hydraulic tappets. This could then lead to the tappets being unserviceable, possibly causing damage to the engine when it is next started up

WARNING:

Extra care and precautions should always be undertaken, when you work on any part of the fuel system. Work on the fuel system should not be attempted in a work place where a natural gas appliance, such as water heater or clothes dryer, with a pilot light may be present, due to the flammability of the fuel. No smoking, bare light bulbs, or naked flames should be allowed in the working place. While working on the fuel system *always* wear safety glasses, having a fire extinguisher close to hand.

Front Suspension and Steering System removal:

Steering system: The steering on 5 series models, use a power-assisted re-circulating ball steering box, which steers the front wheels via a steering linkage consisting of the Pitman, and idler arm, with a center track rod (drag link), a pair of inner track rods and two track rod ends (tracking adjustment via the outer arms). The steering system should have required little maintenance, but maintaining the proper level of power steering fluid in the system. It is best to check the tension of the drive belt and its age. This will give you an idea as to how well the maintenance has been carried out by the last owner. If the belt and fluid are **not** in good condition, it may need more attention later before reassembly.

Front cross member / Engine:

1. Disconnect the negative cable from the battery followed by the positive cable and remove the battery. Place both in a safe place, away from the dismantling area.
2. Relieve the fuel system pressure and if you have AC fitted, you should have this removed prior to dismantling by a qualified engineer and not just let out into the air.
3. Loosen the front wheel nuts and jack the front end of the car up to a good working height. Place stands under the body on the chassis members and take care not to place too far back or the weight of the front end may tip the car forward and off the stands. **MAKE SURE THE CAR IS WELL SUPPORTED AND STABLE** before commencing work.
4. Remove the bonnet and drain the radiator and all fluids from the engine and gearbox.
5. Remove the radiator hoses and the radiator from the car. If the radiator will fit your Python, store in a safe place (E28 or E34 with remote header tank and without AC). If you have A/C the radiator may not fit.
6. Disconnect all pipes and wires to the engine, including the power steering pipes, fuel pipes, throttle cable, vacuum pipes, air filter box, starter motor cable/earth cable, air conditioner pipes and more.
7. The **engine loom plugs** into the **main loom** with a large round black multi plug at the rear of the engine on the bulkhead, twist carefully and remove.
8. The injection and engine management loom **MUST NOT BE CUT!** It will come out in one-piece trust me! First remove the glove box and most of the lower dash covers to expose the **ECU**, the gearbox brain (if an auto) and ABS unit (if installed). Unplug all of these units and remove carefully. **Note: TRY NOT TO TOUCH THE CONNECTING PINS WHERE THE PLUGS HAVE BEEN REMOVED AS THEY CAN BE DAMAGED BY STATIC CHARGES!** Place in a box and store away from damp or extreme heat or cold. Best to hide in the house without the wife seeing and out of reach of the kids.
9. Remove the retaining bolts from the fuse box/relay box on the near side of the car at the rear of the bulkhead. With this loose, you should be able to carefully remove the engine injection loom. There are some earth points that need to be undone. Do not ever pull hard on the loom and feed it slowly through all the holes in the bulkhead. **Do not cut or damage!**
10. With the entire loom removed from the body, roll up and put into a strong bag (a large "jiffy" bag is good). Tie the loom to the engine to keep it out of harms way.
11. The engine and gearbox should have no connections with the body. Make sure you have not forgotten the gearbox loom (Auto Boxes). This will also come out without cutting. There is a

plug on the side of the box that can be disconnected first and then the rest of the loom removed. Disconnect wires for reversing lights.

12. Then disconnect the gear selector cable on Auto boxes. Also remove the rubber boot from around the gear stick from the inside of the car.
13. Disconnect the wires to the MacPherson struts. These are ABS, pad wear sensor/sender and electronic ride control on some 7 series cars.
14. Disconnect the steering shaft from the universal joint on the steering box.
15. Disconnect flexible brake lines from the body end if you are planning to reuse. If not, cut where you can, but **take care NOT to get fluid on yourself or in eyes!**
16. Remove the lower ball joints from each end of the anti roll bar. Then remove the M8 bolts in the clamping plates over the roll bar rubbers. The roll bar can now be removed.
17. Support the front of the engine with an engine crane or a jack or jacks from underneath.
WARNING: While an engine is only supported by a hoist, make sure you **DO NOT** place any part of your body under the engine at any time.
18. Loosen the engine mount nuts from the cross member on each side and remove nuts.
19. Loosen the three nuts under the bonnet at the top of the MacPherson struts each side. Support the wheel hub to prevent it dropping when you remove these nuts completely in a later operation.
20. Loosen the six M10 bolts up into the body through the cross member. Do not remove at this point. Loosen the two M14 bolts through the tube type cross member at the rear of the main cross member. Remove the nuts from the roll bar rubber plate to the body. This should allow the tube type cross member to drop, but not come away completely.
21. Support the cross member with a trolley jack. Remove the six M10 bolts. Lower the jack slightly and the cross member should start to come down. If it does not move, it may be jammed on the location dowels. You will need to pry it down away from the body/chassis. Make sure you lower each side level, as the side with the steering gear is much heavier, as not to bend the dowels.
22. Lower the cross member down on the arms of the suspension. Remove the nuts from the top of the MacPherson struts and lower down both sides.
23. With help, pull the top of the MacPherson strut out from each wheel arch and drag forward. Remove the whole front suspension and cross member out from under the car. Lift off the ground to avoid damaging the brake disc shields when dragging out. Put to one side for dismantling.
24. Place the trolley jack under the gearbox. Make sure the engine crane is connected to the lifting eyes of the engine with chains or straps of the required size to lift the weight of the engine and gearbox (no more than 250 kg) for most BMW engines.
25. Take the weight of the engine (if you are not already) on the crane. Remove the 4 M8 bolts from the gearbox mounts and lower the jack down until the jack is full down. Now pull the engine forward and lift up with the crane until it is out of the body.
26. Put in a safe place for cleaning and reworking as desired.
27. With all the major parts removed, it is time to remove the smaller parts. Remove the header tanks, brake servo, ABS motor, horns (if in good condition), washer pump (if suitable type)

28. Remove the steering wheel, plastic shroud covers and disconnect the wiring from the main loom.
29. Remove the steering column by removing the three 3 M8 bolts from the main column bracket along with a long M8 transverse bolt which goes through the pedal box. Keep all the bolts and the black plastic spacers (2 in the column and 1 on the pedal box).
30. Remove the long M8 transverse bolt from the top of the two arms at the bottom of the column body and withdraw the column from the car, along with the lower shaft and retain. **Note:** Do not remove the two lower M8 bolts through the rubber bushes as you will need these arms and parts to refit to your Python.
31. **Note:** If you plan to retain the ABS system, you will need to remove the main loom from the car as the ABS loom is bound in with the main loom. These can be separated without too much hard work and RVD can supply the relevant wiring information required to refit to your Python. To do this, you will have to remove most of the dash and interior of the car. This includes the seats and all carpets, as the loom was the FIRST part in the car, it's the LAST out! It is fine to cut the main loom at doors, sunroof, wires to lights and other **ancillary** parts. **DO NOT CUT ANY OF THE ABS SENSOR WIRES OR CONNECTIONS OR THROUGH THE MAIN PART OF THE LOOM.**
32. **Note: If NO ABS is required** you will only need to remove the plugs and sockets required to connect to the steering column plugs and the engine socket. It is best to cut off from the main loom with as long a piece of loom as you can (around 1ft on engine socket & 8" on steering column) for connection to new loom. Remove all relays and black boxes from the two fuse boxes under the bonnet. You may want to remove the computer boxes from under the rear seat. These are not used on your Python and can sell these to recoup some of the donor price.
33. Remove any small parts that you think you may need. Seat belts, if in good condition and of the type you require for your Python, can be used. It is a good idea to remove at least the bolts and spacers and nut covers from the belts, as these are hard to obtain (7/16" UNF thread).
34. Take one last look around the Donor car and make sure that you have not left any tools or spacers, bolts, sensors or anything that is of use. It is best to take off more than you may need and you can always throw it away later!
35. Check off all your parts on the list at the end of this section before disposing of donor.

Front suspension dismantling:

1. Remove the two M14 bolts from the **trust arms** through the tube type cross member and discard the cross member (not required on your Python). Brackets welded to chassis for arm mounting.
2. Remove the ball joints from the ends of the center track rod (drag link) to the outer track rod. Take care not to damage the thread when removing. Keep the nut level with the end of the thread and support on a **SOLID** surface or bench and hit square with a large hammer 2lb or more with a sharp blow (it's the shock that will release, not the power). Use a ball joint splitter for best results. **Note:** Not the fork type (wedge) ball joint splitter, as this will damage the rubber of the joint and is only good for removing old worn joints.
3. Now remove the two M10 bolts from the ends of the control arms (front lower wishbone) that attach them to the cross member. Replace bolts and nuts in the end of the arms for safekeeping.
4. You will now have three large parts that can be handled better. Refer to the "Strut Preparation and Modification section & Cross Member Modification section. **Give yourself a pat on the back for getting all this done!!**

Donor Parts Required Check list

	<u>Description of parts</u>	<u>Yes</u>	<u>No</u>
1	2 rear swinging arms complete with brakes		
2	Differential with all bolts and Speedo sensor		
3	Two drive shafts & all bolts and washer plats		
4	Propeller shaft & all bolts and nuts		
5	Four wheels & 20 wheel bolts		
6	Engine & gearbox, With all wires and pumps Piping and Filters and fuel system		
7	Radiator (if correct type)		
8	Front cross member & steering box Drag link		
9	Two MacPherson struts & arms, Brakes complete		
10	Front anti roll bar & two Rubbers		
11	Two Rear anti roll bar rubbers and brackets		
12	ABS pump and Wiring (if required)		
13	Steering column & wheel, All covers / switches		
14	ECU units and ABS (Gearbox) control Units		
15	Seat belts and bolts spacers (if required)		
16	Main Wiring loom (or plugs & sockets as required, relays black boxes)		
17	Horns and small electrical parts (bulbs etc)		
18	Header tanks & fluid reservoirs		
19	Brake servo and master cylinder		
20	Fuel pump and pulse damper (if not fitted in fuel tank as some models, can be used if you can modify)		