N54 Performance Lightweight Flywheel Installation Instructions

Proper service and repair procedures are vital to the safe, reliable operation of all motor vehicles as well as the personal safety of those performing the repairs. Standard safety procedures and precautions (including use of safety goggles and proper tools and equipment) should be followed at all times to eliminate the possibility of personal injury or improper service which could damage the vehicle or compromise its safety.

INTRODUCTION

Today we'll be installing our Turner Performance N54 lightweight flywheel into our BMW 335i. This car came from the factory with a dual mass flywheel mated to a non-damped clutch disc, and a self adjusting pressure plate that maintains pedal feel and free play as the clutch wears.

Once we remove the original components, we'll bolt up our lightweight single mass flywheel, followed up by a new sprung-hub clutch disc and a self adjusting pressure plate. We'll also install a new throwout bearing and pilot bearing, and show you how to inspect all other key components for wear. This Turner engineered exact-fit replacement flywheel bolts up without any modification. It's less expensive than a new OE dual mass flywheel, and its reduced mass will give us crisper throttle response, improved rev matching, and more positive shifting.

Some experience is recommended for this job, but we're going to lay it out step by step, so even if you don't have much "wrench" time under your belt, we'll make it easy for you. There are a few special tools that are required, be sure to read through these instructions before you begin.

If you have an automotive lift and previous experience, you'll probably be able to knock this out in an afternoon. If you're working on jack stands or have less experience you may want to plan an entire weekend for the project. You'll be working with some heavy components so keep a friend nearby for a helping hand.

PROJECT OVERVIEW

We're going to begin this project under the hood. First we'll remove the cowl panels and airbox, then we'll tackle the trickiest part of the job, removing the two upper bolts on the bell housing. Once we get that out of the way, we'll disconnect the battery and raise the vehicle up so we can work underneath. Under the car, we'll remove the exhaust, disconnect the driveshaft, remove a few more things as required, and the transmission will be out before you know it. With the transmission out we'll install the new flywheel and clutch, and inspect the remainder of the components for wear. Reassembly will be even easier, and you'll be back on the road!

TABLE OF CONTENTS

TECHNICAL NOTES

This flywheel has been designed in-house using state of the art 3D modeling and simulation software to optimize strength and durability under extreme clamp and torque loading as well as centrifugal forces

Hardened 4140 chromoly for excellent engagement feel and durability

Precision balanced

Corrosion resistant black zinc coating on all non machined/ non critical surfaces

SFI 1.1 tested and certified to ensure safe operation under the most extreme conditions

Induction hardened ring gear for superior wear resistance

Performance Benefits:

- Crisper throttle response
- Smoother shifting and improved rev-matching
- Improved acceleration
- Weight savings

Our lightweight flywheels are manufactured in an ISO certified facility to exacting standards

OPTIONAL REPLACEMENT PARTS

OEM 335is Unsprung Clutch Kit
(includes clutch disc, pressure plate, throwout bearing, clutch fork & pressure plate bolts)

HD Sprung Street Performance Clutch Kit
(includes clutch disc, alignment tool, pressure plate, & pressure plate bolts)

Xtreme Sprung Street Performance Clutch Kit
(includes clutch disc, alignment tool, pressure plate, & pressure plate bolts)

OEM Clutch Alignment Tool **(QTY 1)**
- *REQUIRED* w/OEM clutch kit -

M12x90 Bell Housing Bolts **(QTY 5)**
- Optional with all clutch kits -

Flywheel Bolts **(QTY 8)**
- Optional with all clutch kits -

Pilot Bearing **(QTY 1)**
- Optional with all clutch kits -

ECS Clutch Fork Pivot Pin **(QTY 1)**
- Optional with all clutch kits -

INSTALLATION NOTES

- **RH** refers to the ***passenger side*** of the vehicle.
- **LH** refers to the ***driver side*** of the vehicle.
- Always use the proper torque specifications.
- If applicable to this installation, torque specifications will be listed throughout the document and at the end as well.
- Please read all of these instructions and familiarize yourself with the complete process **BEFORE** you begin.

GENERAL PREPARATION AND SAFETY INFORMATION

Turner Motorsport cares about your health and safety, please read the following safety information. This information pertains to automotive service in general, and while it may not pertain to every job you do, please remember and share these important safety tips.

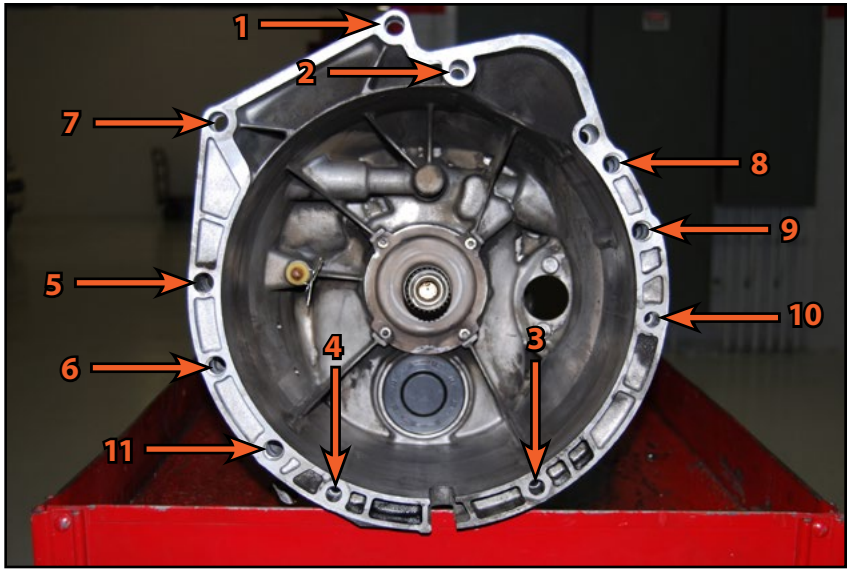
- Park your car in a safe, well lit, level area.
- Shut the engine off and remove the key from the ignition switch.
- Make sure any remote start devices are properly disabled.
- **ALWAYS** wear safety glasses.
- Make sure the parking brake is applied until the vehicle is safely lifted and supported.
- Whether lifting a vehicle using an automotive lift or a hydraulic jack, be sure and utilize the factory specified lift points.
- Lifting a vehicle in an incorrect location can cause damage to the suspension/running gear.
- **ALWAYS** support the vehicle with jack stands.
- **ALWAYS** read and follow all safety information and warnings for the equipment you are using.

NEVER get underneath a vehicle that is supported only by a jack, and ALWAYS make sure that the vehicle is securely supported on jack stands.

BELL HOUSING BOLT LOCATIONS

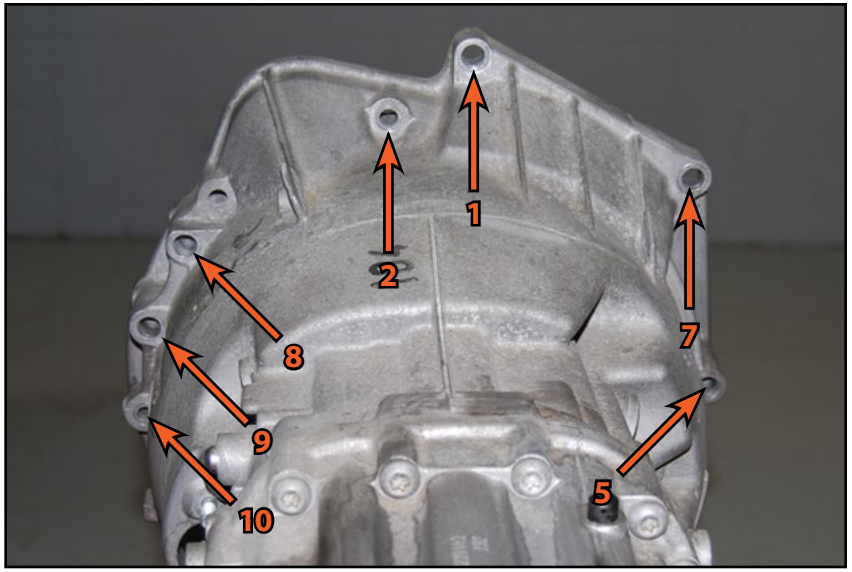
Accessing and removing the bell housing bolts is one of the most difficult parts of this job. Use these location charts and the template on page 9 to assist with removal and to also make sure that you reinstall the bolts in the correct locations.

1. Bell Housing Bolt M12x50mm Bolt ..... E14 Torx
2. Bell Housing/Starter M10x85mm Bolt ..... E12 Torx
3. Bell Housing Bolt M8x50mm Bolt ..... E10 Torx
4. Bell Housing Bolt M8x50mm Bolt ..... E10 Torx
5. Bell Housing Bolt M12x90mm Bolt ..... E14 or E18 Torx
6. Bell Housing Bolt M12x90mm Bolt ..... E14 or E18 Torx
7. Bell Housing Bolt M12x50mm Bolt ..... E14 Torx
8. Bell Housing Bolt M12x90mm Bolt ..... E14 or E18 Torx
9. Bell Housing Bolt M12x90mm Bolt ..... E14 or E18 Torx
10. Bell Housing Bolt M8x50mm Bolt ..... E10 Torx
11. Bell Housing Bolt M12x90mm Bolt ..... E14 or E18 Torx



NOTE

Bolts 8 and 9 also hold a wiring harness bracket in place.

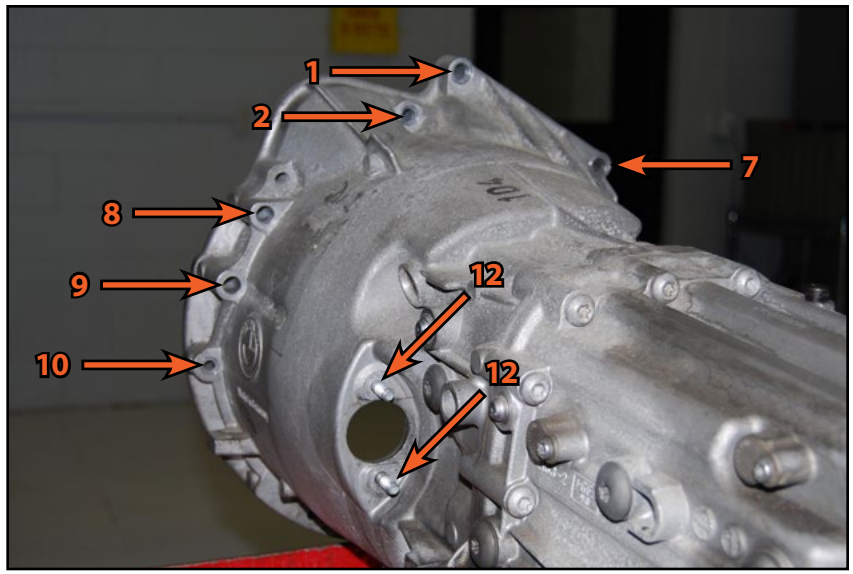


NOTE

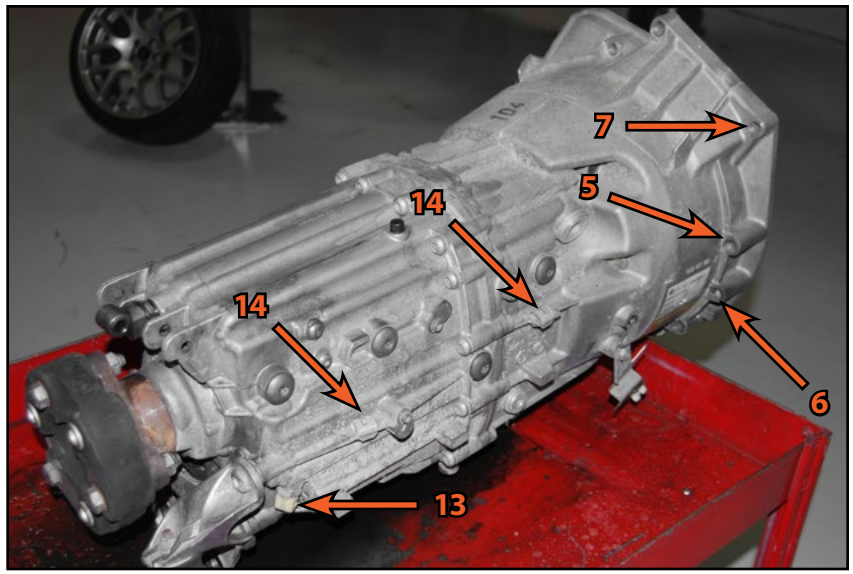
The original bell housing bolts in locations #5, #6, #8, #9, and #11 are aluminum and require an E18 Socket. Replacement bolts are steel and require an E14 socket. Your vehicle may be equipped either way depending on past service.

BELL HOUSING BOLT LOCATIONS

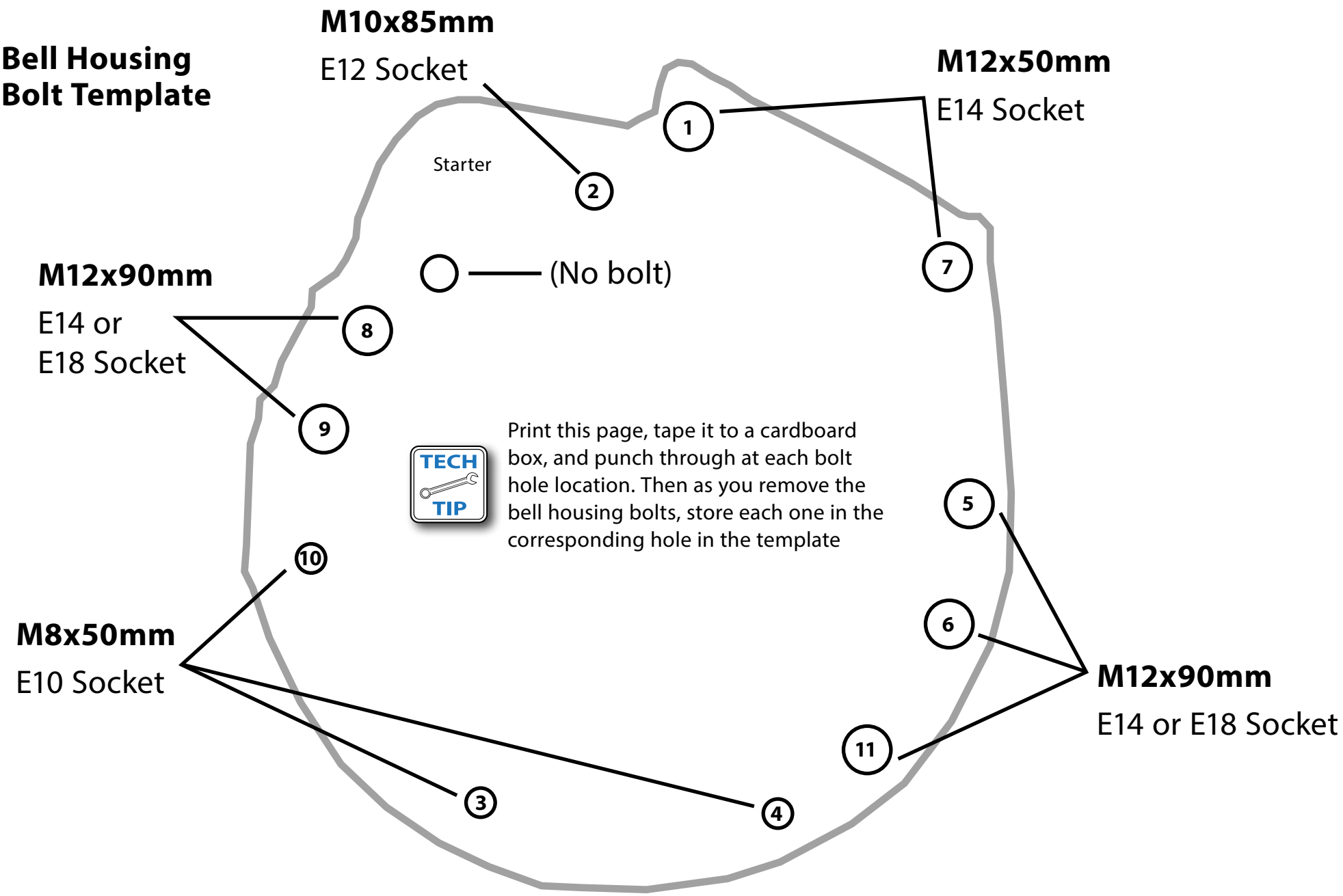
1. Bell Housing Bolt M12x50mm Bolt ..... E14 Torx
2. Bell Housing/Starter M10x85 Bolt ..... E12 Torx
5. Bell Housing Bolt M12x90mm Bolt ..... E14 or E18 Torx
6. Bell Housing Bolt M12x90mm Bolt ..... E14 or E18 Torx
7. Bell Housing Bolt M12x50mm Bolt ..... E14 Torx
8. Bell Housing Bolt M12x90mm Bolt ..... E14 or E18 Torx
9. Bell Housing Bolt M12x90mm Bolt ..... E14 or E18 Torx
10. Bell Housing Bolt M8x50mm Bolt ..... E10 Torx



12. Slave Cylinder Mounting Nuts
13. Reverse Light Switch
14. Reverse Light Harness Clips



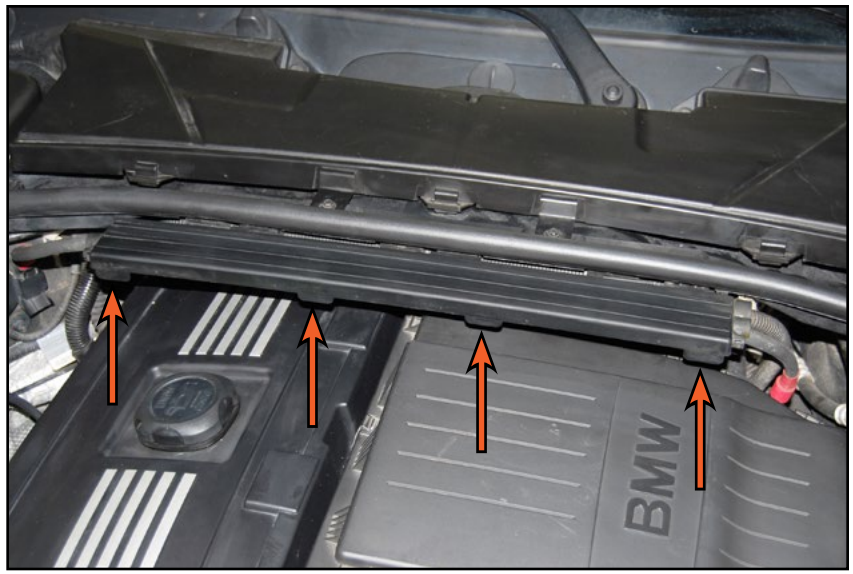
Bell Housing Bolt Template



TRANSMISSION REMOVAL

Step 1:

Working under the hood, remove the upper wiring harness channel cover by pulling out each of the four tabs (arrows) to release them, then lifting the cover upwards and unhooking it at the rear.



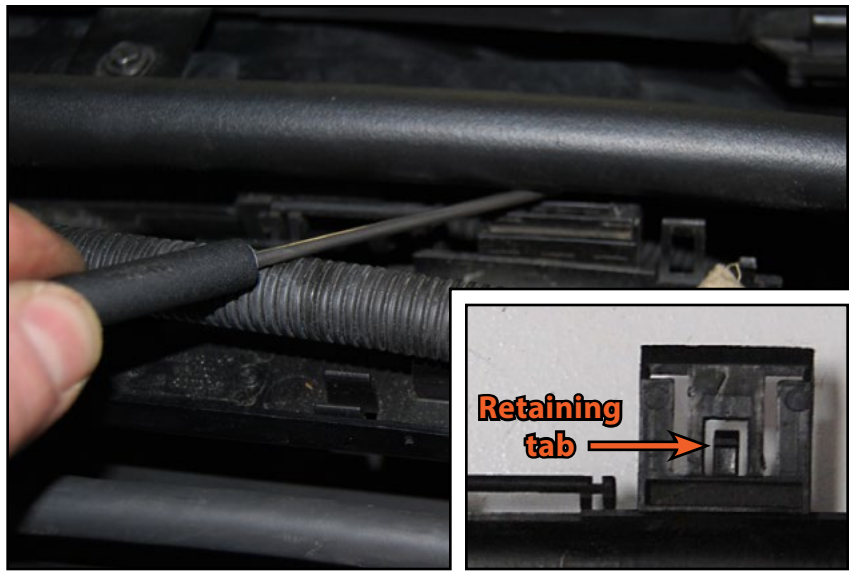
Step 2:

Pull the battery cable and corrugated wiring harness out of their retaining clips in the wiring harness channel.

TRANSMISSION REMOVAL

Step 3: Small Pick

Carefully release the three retainers for the wiring harness channel by pushing down on each retaining tab. As you release each one, pull out slightly on the channel to prevent the tabs from locking back in place. The inset picture shows a close up view of a retaining tab.



NOTE

These tabs and the cowl panel mounts are very fragile and can be easily broken. Use caution during removal.

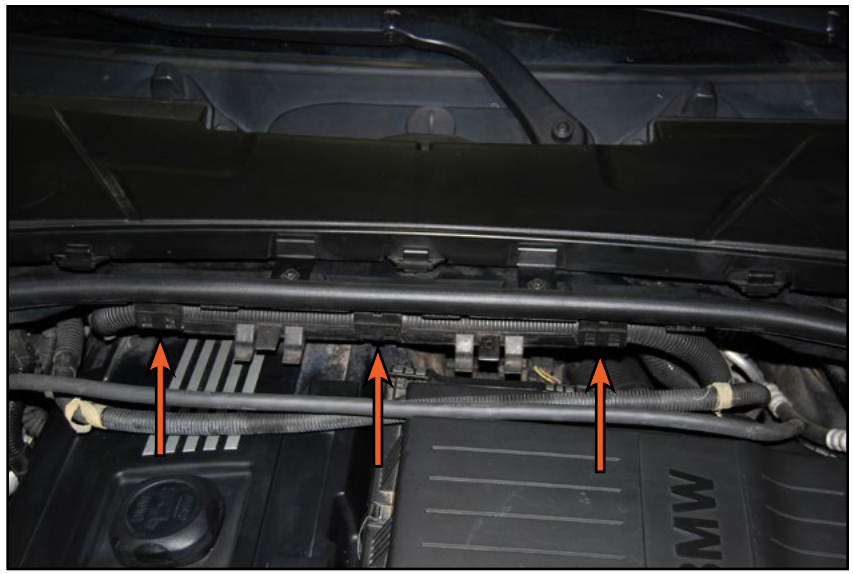
Step 4:

Pull the wiring harness channel forward and remove it from the cowl panel.

TRANSMISSION REMOVAL

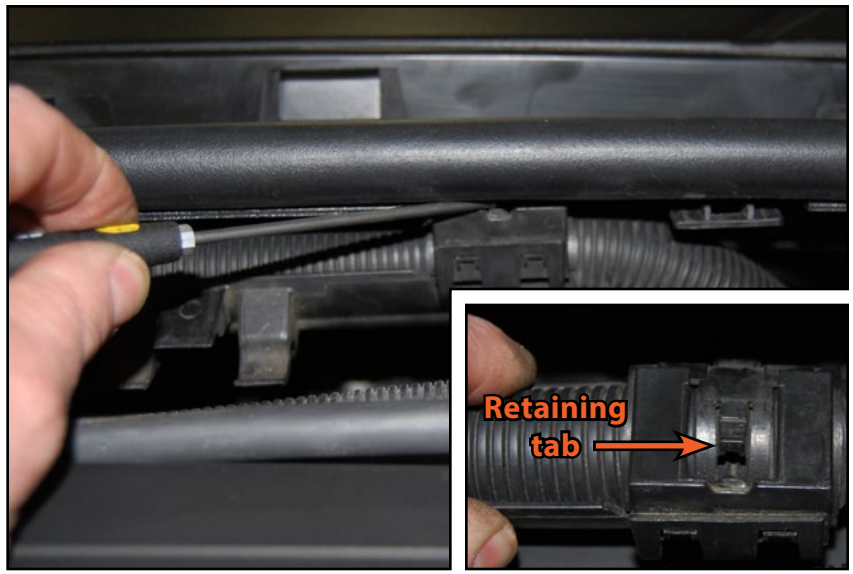
Step 5:

The large corrugated wiring harness mounts to the cowl panel at three different locations (refer to the photo on right).



Step 6: Small Pick

Carefully release the three retainers for the large wiring harness by pushing down on each retaining tab. As you release each tab, pull out on the harness to prevent the tabs from locking back in place. With all three retainers released, pull the harness off the cowl panel. The inset picture shows a close up view of a retaining tab.



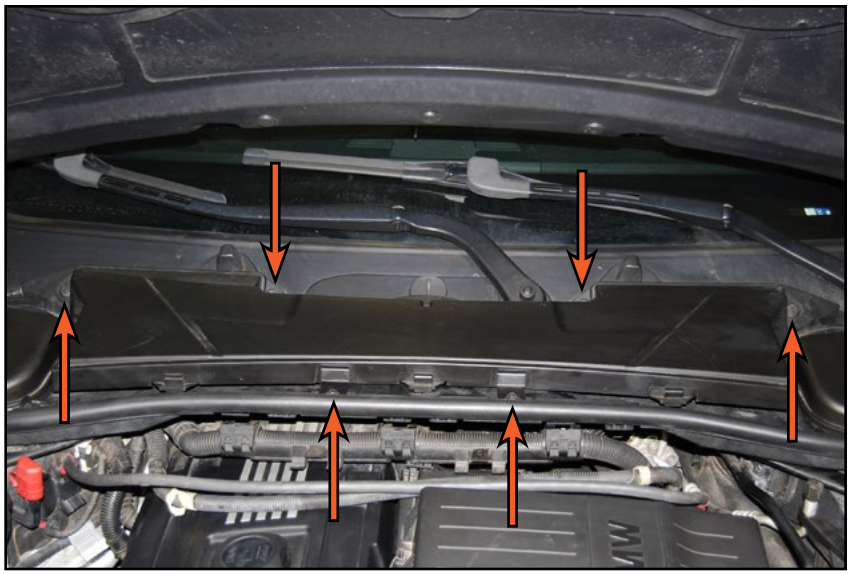
NOTE

These tabs and the cowl panel mounts are very fragile and can be easily broken. Use caution during removal.

TRANSMISSION REMOVAL

Step 7: 8mm Nut Driver or 8mm Socket & Ratchet

Remove the six self threading screws holding the cabin air filter housing to the cowl panel.



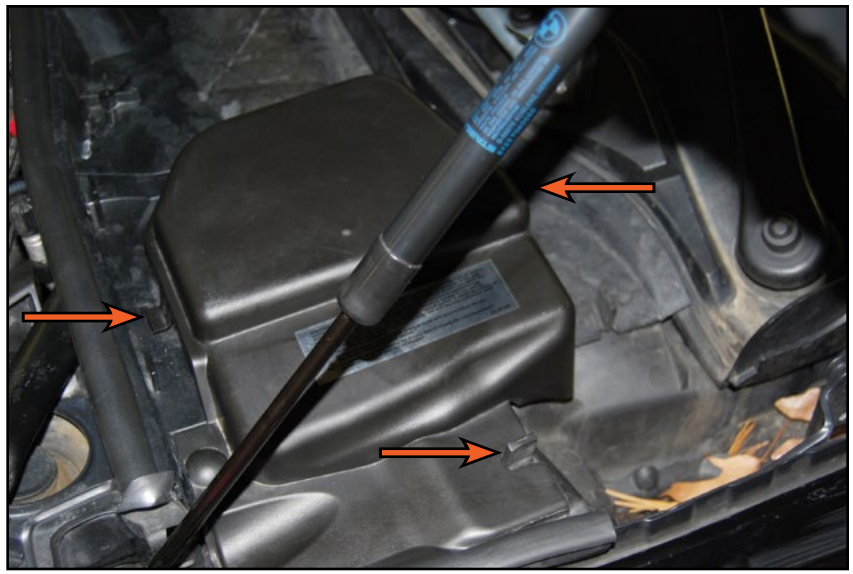
Step 8:

Gently lift up on the cabin air filter housing and remove it from the cowl panel.

TRANSMISSION REMOVAL

Step 9:

Remove the brake master cylinder cover by sliding out the rubber seal retainer and releasing the front and rear retaining tabs. Lift the cover up and remove it.



Step 10:

Moving to the passenger side of the vehicle, disconnect the air temperature sensor by pushing in on the connector release tab and pulling the connector off of the sensor.

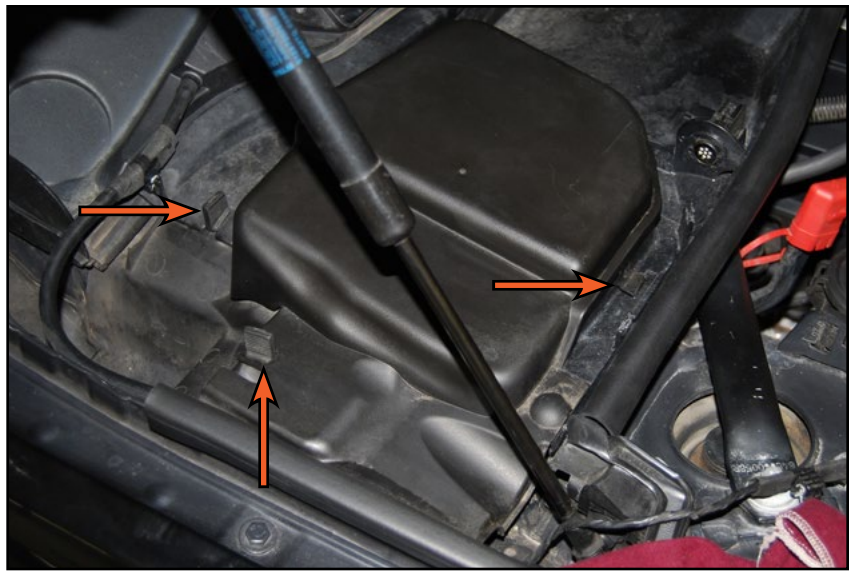
TRANSMISSION REMOVAL

Step 11:

Remove the air temperature sensor wiring harness retention clips from the cowl tabs by pulling up on them. These clips have small "teeth" that grip the cowl tabs as they are pushed into place, if they are difficult to release by hand a small flat blade screwdriver can be used to pry them off. Lay the harness to the side after clips have been removed.

Step 12:

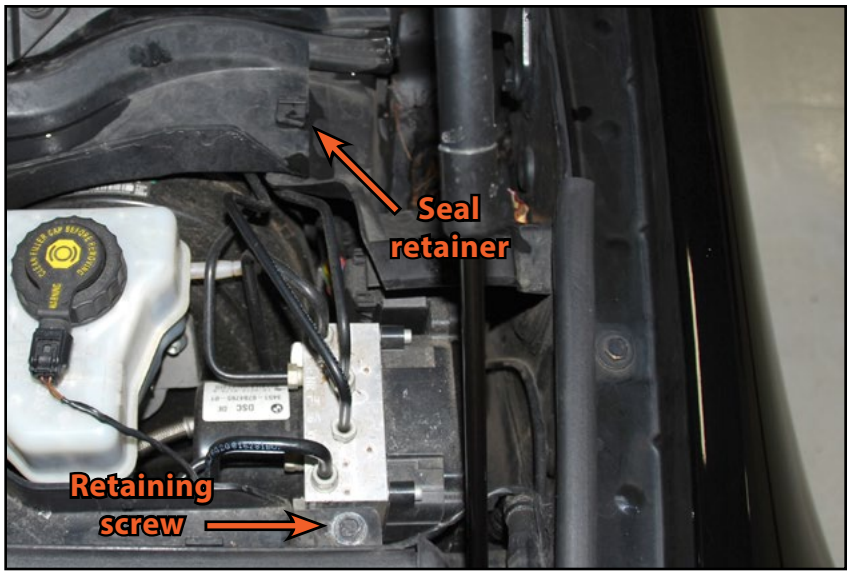
Remove the passenger side cowl cover by sliding out the rubber seal retainer and releasing the front and rear retaining tabs. Lift the cover up and remove it.



TRANSMISSION REMOVAL

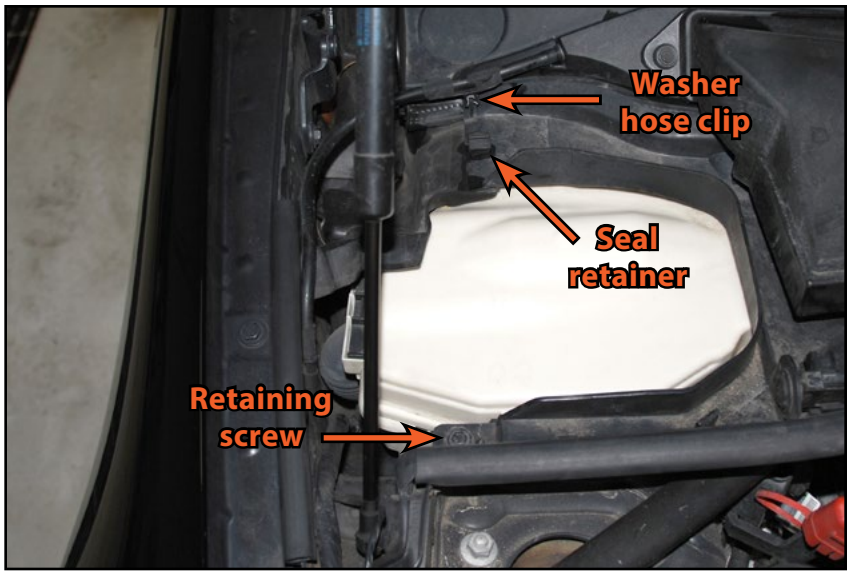
Step 13: 8mm Nut Driver or 8mm Socket & Ratchet

Slide the driver side cowl seal retainer out of the slot in the cowl panel, and remove the screw holding the cowl panel to the body of the car.



Step 14: 8mm Nut Driver or 8mm Socket & Ratchet

Slide the passenger side cowl seal retainer out of the slot in the cowl panel, and remove the washer hose retaining clip from the cowl tab. This clip has small “teeth” that grip the cowl tab as the clip is pushed into place. Remove the screw holding the cowl panel to the body of the car.



TRANSMISSION REMOVAL

Step 15:

Tilt the cowl panel up at the front, then lift and pull it forward to remove it from the vehicle.

NOTE

There are 5 tabs that hold the cowl panel tightly to the seal at the rear of the panel. These can be easily broken. Use caution during removal.

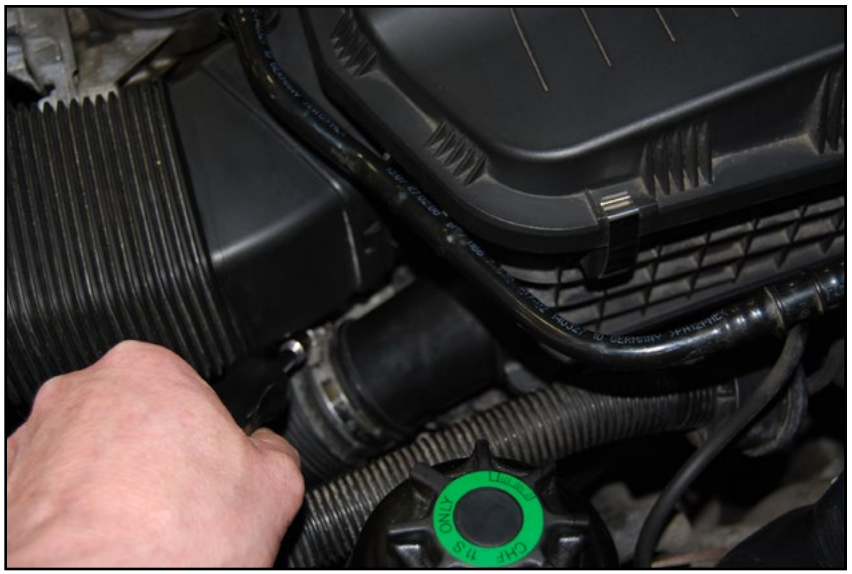
Step 16:

Disconnect the brake booster vacuum line by squeezing the two retaining tabs together and pulling up on the line. Pull the line out of the retaining clip on the side of the air box.

TRANSMISSION REMOVAL

Step 17: 6mm Nut Driver or Flat Blade Screwdriver

Loosen the clamps holding the front and rear turbo inlet tubes to the air box (front clamp shown).



Step 18: T20 Torx Driver

Remove the two screws holding the intake air duct to the radiator core support.

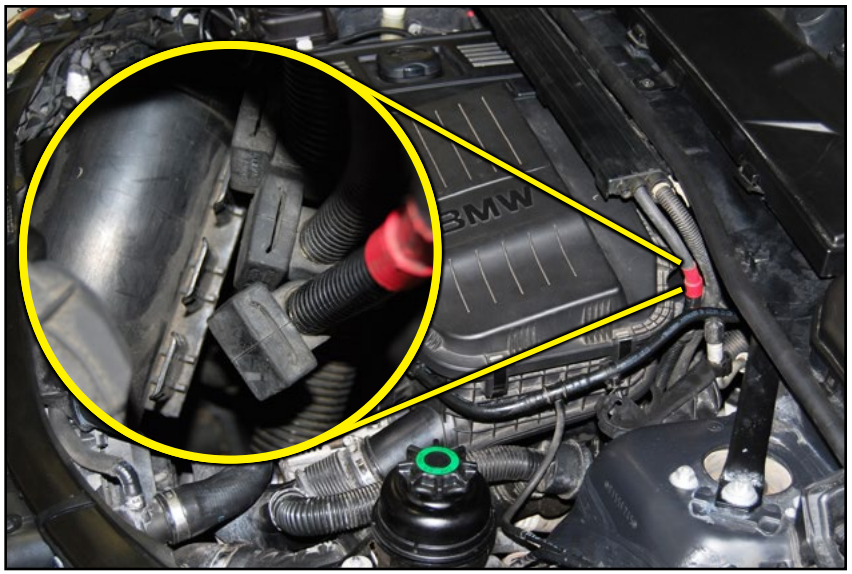
TRANSMISSION REMOVAL

Step 19: Flat Blade Screwdriver

Release the intake air duct from the tabs on the air box, then pull the duct off of the air box and remove it from the vehicle.

Step 20:

Pull all three wiring harness retainers off of the retainer bracket on the side of the air box.



TRANSMISSION REMOVAL

Step 21:

Remove the front and rear turbo inlet tubes from the original air box.

Step 22:

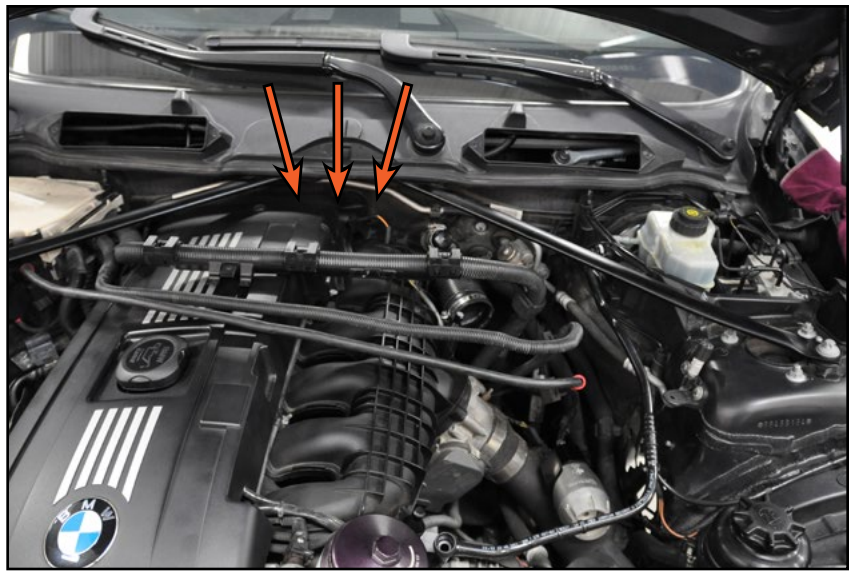
Lift up on the air box and remove it from the vehicle. Be careful to make sure all hoses and wires are clear during removal.

TRANSMISSION REMOVAL

Step 23:

Ok, now that you've removed the airbox and cowl, we've got some breathing room, and we'll need it because we're about to tackle the trickiest part of the job. Look between the rear of the engine and the firewall and locate the uppermost bell housing bolt and the upper starter bolt (#s 1 and 2 on the bell housing bolt charts on pages 8 and 9).

You'll probably need a light to see them, and a flashlight with a direct beam will be the most helpful.



Step 24:

Here's a view from the side where you'll actually be able to see the bolts. The only one visible in this picture is the upper starter bolt, but with a flashlight and the right line of sight, you can see them both.

We'll remove them in the next two steps and give you a couple tips to make it a little easier.

TRANSMISSION REMOVAL

Step 25: E14 Torx Socket & Flex Head Ratchet

The "key" to removing these two bolts is in the tools you use. Take an E14 Torx socket and place it on a flex head ratchet, then angle the head of the ratchet as shown in the picture. This combination is going to make this much easier.

Step 26:

First remove the upper bell housing bolt (#1 in the bell housing bolt chart), using the E14 Torx socket and ratchet as you've set it up in step 25. Guide the socket onto the head of the bolt and loosen it. You'll find that there is just enough room to get this done.

Since it's too tight to really swing the ratchet, once the bolt is loose, try to reach in and turn it out by hand. If you cannot unthread it, here are two tricks you can use:

1. An 11mm 12-point wrench will also fit the head of this bolt, if you have a stubby wrench it works best.
2. An 11mm 6-point socket will also fit on the head of this bolt, use a ¼" drive ratchet and small socket to help back out the bolt.

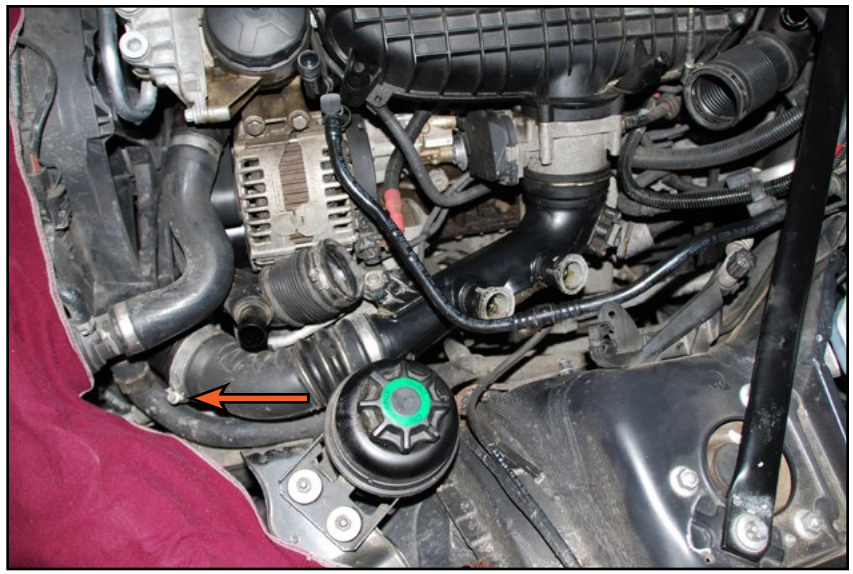
TRANSMISSION REMOVAL

Step 27: E12 Torx Socket & Flex Head Ratchet

Now remove the upper starter bolt (#2 in the bell housing bolt chart). This one will require an E12 Torx socket, and you can use the same method and tricks to get it out, except in this case a 10mm 12-point wrench or 10mm 6-point socket can help you to back out the bolt once it is loosened.

Step 28: Flat Blade Screwdriver

Loosen the clamp securing the charge pipe elbow to the intercooler pipe and pull the flexible elbow off the pipe. If you have an aftermarket charge pipe installed, make sure to disconnect it at this point.



NOTE

This will prevent damage to either component when the engine is tilted backwards to lower the transmission.

TRANSMISSION REMOVAL

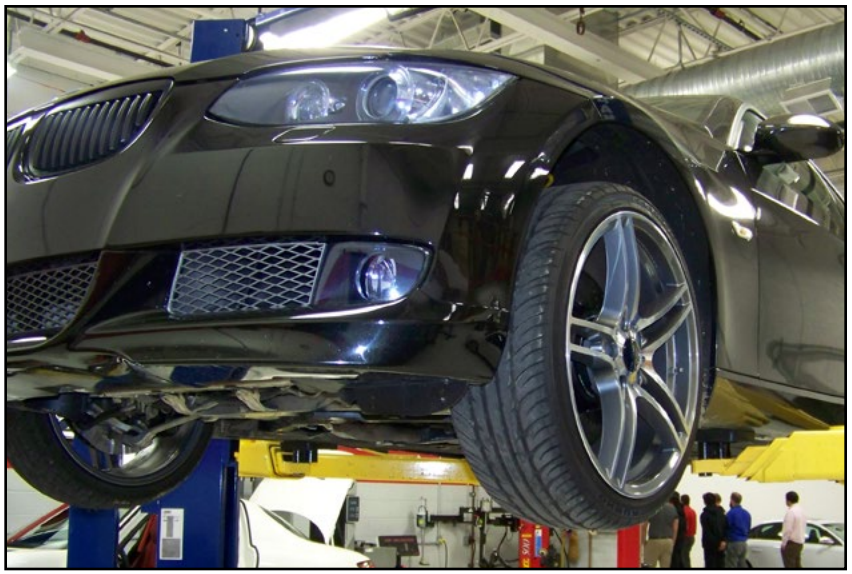
Step 29: 10mm Socket & Ratchet or 10mm Wrench

Disconnect the negative battery terminal (the battery is located in the trunk). Isolate the terminal so it does not accidentally contact the negative battery post.

CAUTION: To reduce the risk of fire, explosion, or personal injury, **ALWAYS** disconnect the battery by removing the negative battery terminal.

Step 30: Automotive Lift (preferred)

Safely raise and support the vehicle. Be sure to place the transmission in neutral once the vehicle is off the ground.



TECH TIP

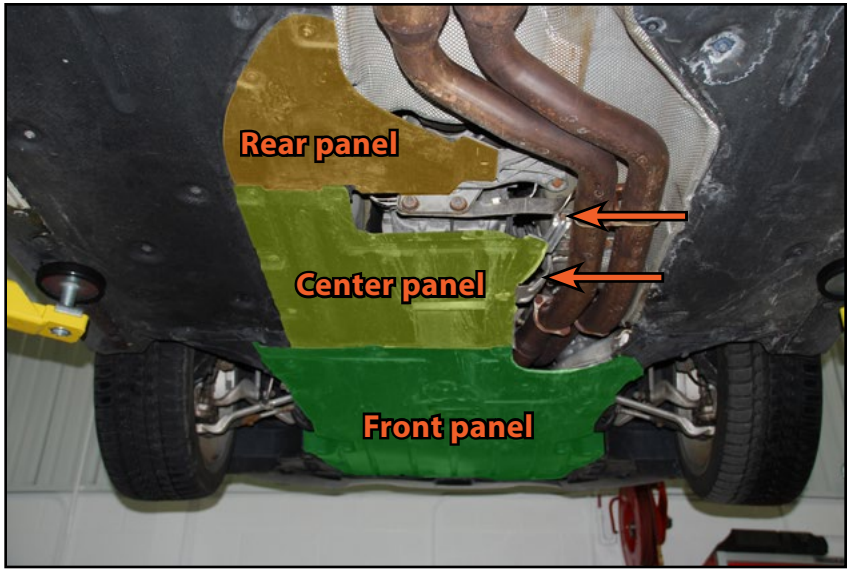
We strongly recommend the use of an automotive lift and a transmission jack for this procedure. If you are using jack stands, the job will be more difficult and extra time will be required.

TRANSMISSION REMOVAL

Step 31: 8mm, 10mm, 13mm Sockets & Ratchet

Remove the three plastic insulation panels below the engine and transmission.

The center panel has two brackets (arrows) that can be disconnected at either the panel or the body. Disconnect them at the body and remove them with the center panel. This will keep them out of the way for transmission removal.



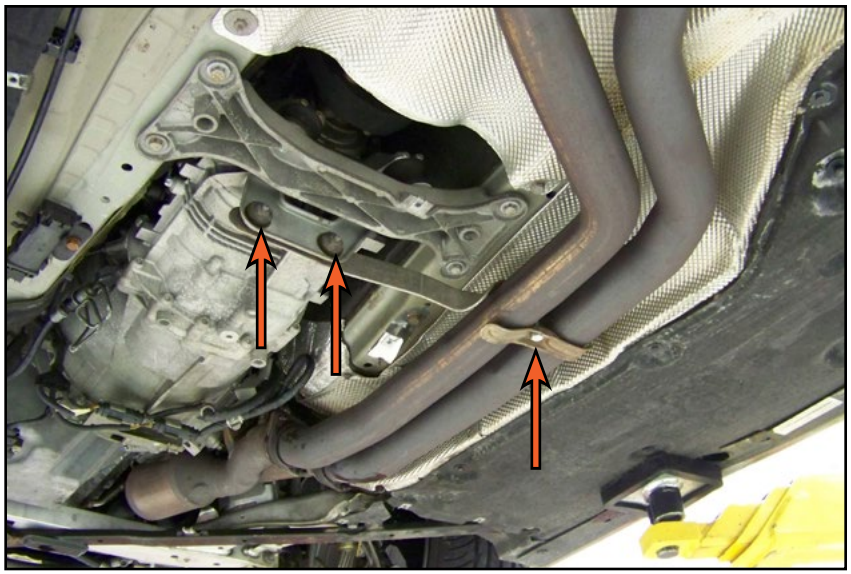
Step 32: 13mm, 18mm Sockets & Ratchet

Remove the rear body V-brace by removing the eight center plate bolts and the two rear bolts.

TRANSMISSION REMOVAL

Step 33: 13mm, E10 Sockets & Ratchet

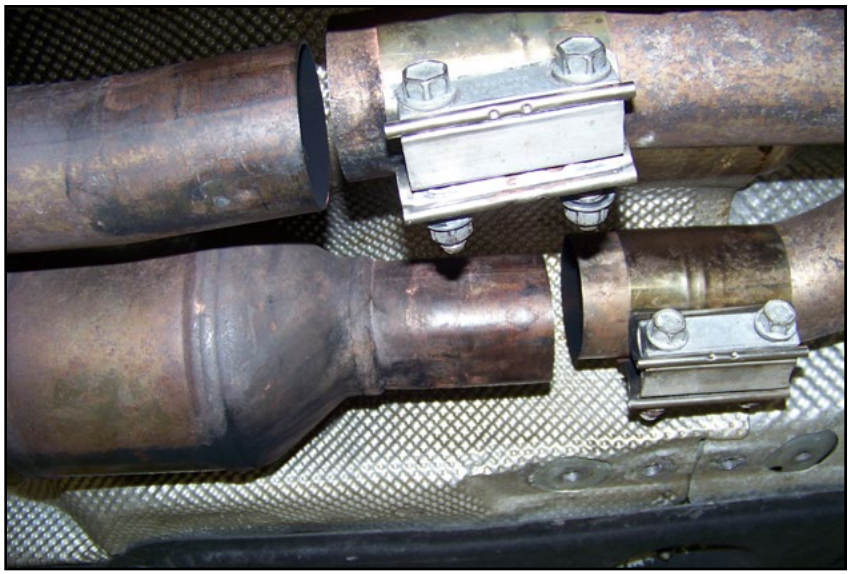
First remove the front exhaust support clamp holding the two center pipes, then remove the entire support bracket by removing the two bolts that secure it to the rear transmission bracket.



Step 34:

Choose the following option that is applicable to your car:

1. If the exhaust system is completely original, you will be removing the entire system as one piece. Continue with step 35.
2. In many instances, the exhaust has been cut and sleeved between the downstream converters and the x-pipe. If the exhaust on your car is sleeved, loosen the sleeves and slide them onto the rear exhaust section as shown in the picture at right, then continue with step 35.



TRANSMISSION REMOVAL

Step 35: 13mm Socket & Ratchet

Remove the four nuts securing the center exhaust pipes to the catalytic converter flanges (two on each flange).

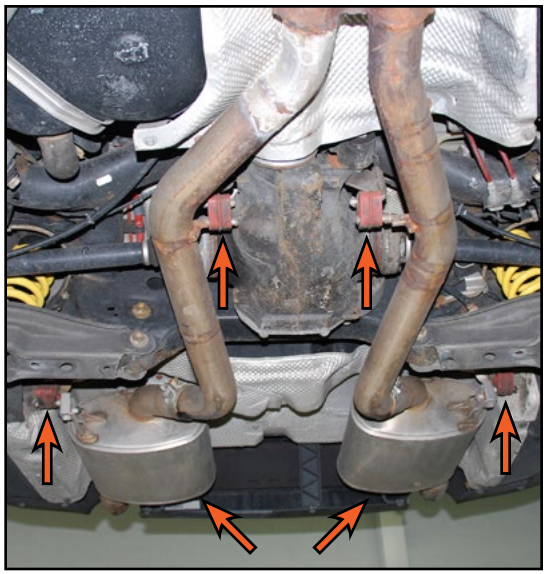
- If you have a sleeved system, remove both center exhaust sections at this time, then proceed to step 37. You do not need to remove the rear exhaust system.
- If you have a one piece system, continue with step 36.

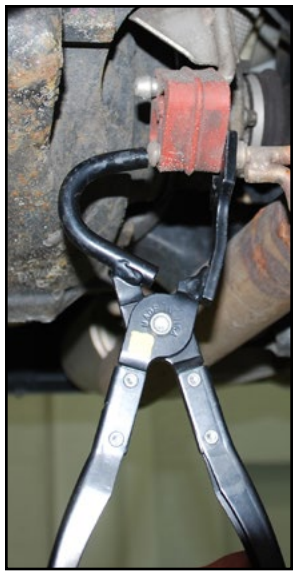
Step 36: Exhaust Hanger Removal Tool

There are six rubber hangers (arrows) holding the exhaust system up. Request the help of an assistant to support the exhaust, then remove each of the hangers and lower the complete system from the car.

The picture on the right shows an exhaust hanger removal tool being used on one of the hangers.

CAUTION: The exhaust system is very heavy. Be sure to request assistance to prevent personal injury and/or damage to the exhaust.





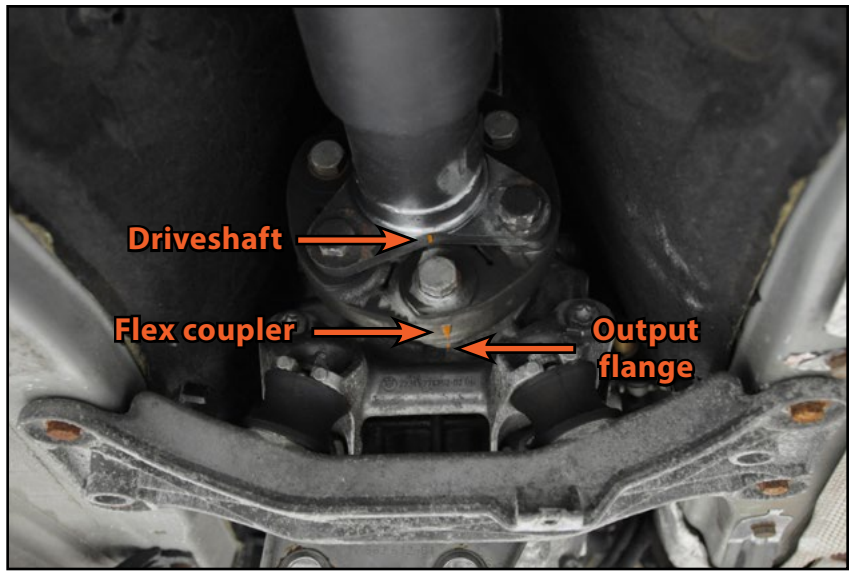
TRANSMISSION REMOVAL

Step 37: 8mm, 10mm Sockets & Ratchet

Remove the center heat shield by removing the securing screws around the perimeter.

Step 38: Paint Marker

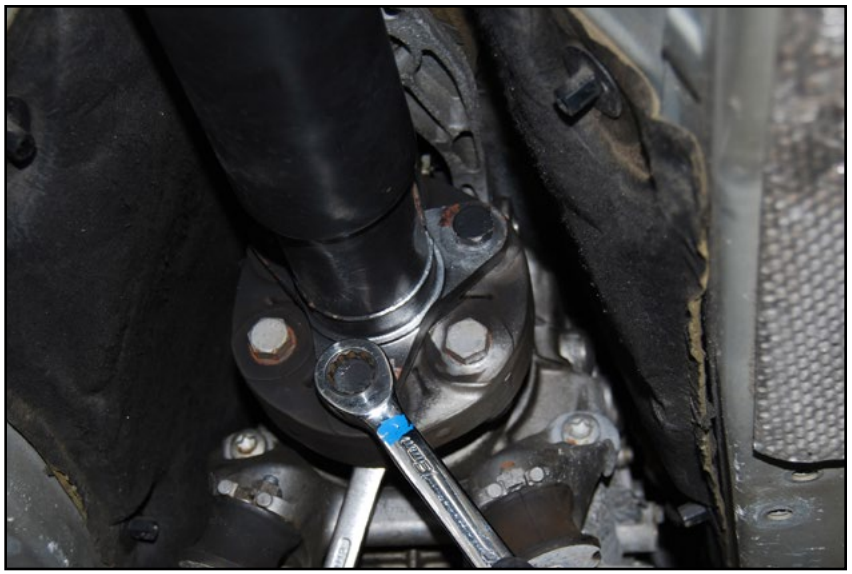
Make reference marks on the front of the driveshaft, the rubber flex coupler, and the transmission output flange so you can re-index them during reassembly. This will prevent the possibility of a driveline vibration.



TRANSMISSION REMOVAL

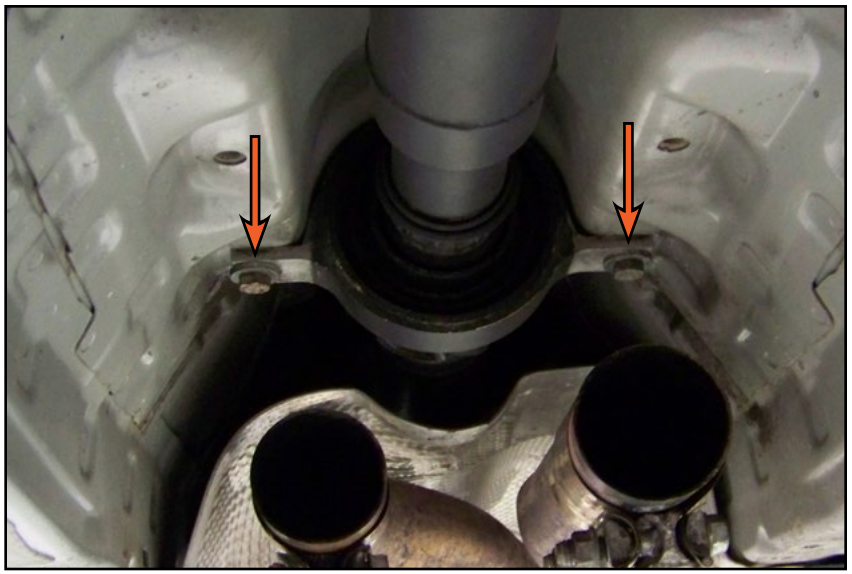
Step 39: 18mm Open/Boxed End Wrenches

Remove the three bolts holding the driveshaft to the flex coupler.



Step 40: Transmission Jack

Remove the two bolts holding the driveshaft center support bearing to the body tunnel.



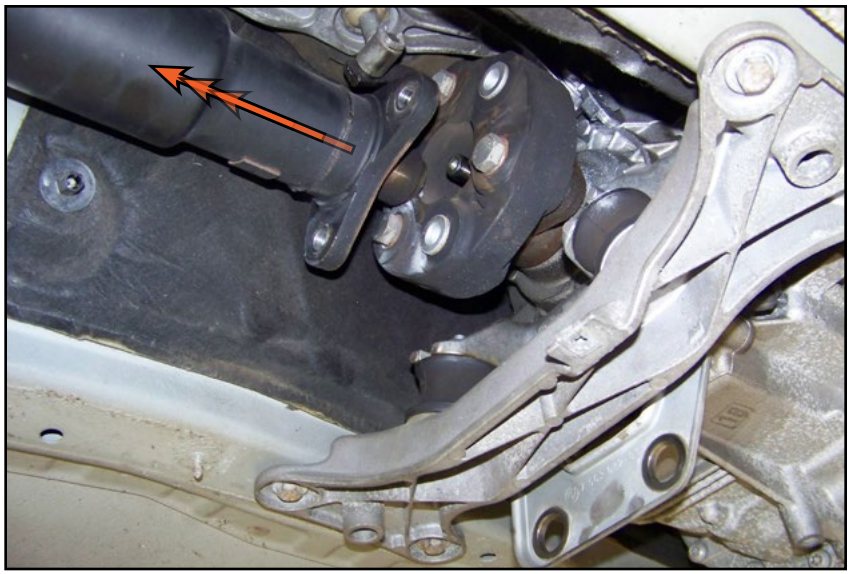
TECH TIP

The driveshaft center support bearing is offset. Note the installation position so you do not install it upside down during reassembly. The majority of the bearing will fit up into the tunnel when properly installed.

TRANSMISSION REMOVAL

Step 41: Flat Blade Screwdriver

Slide the driveshaft rearward off the rubber flex coupler. You may need to lever slightly between the driveshaft and flex coupler to separate the two.



Step 42:

Allow the driveshaft to hang down and off to the side, but secure it with mechanics wire so the weight of it is not on the rear driveshaft CV joint.

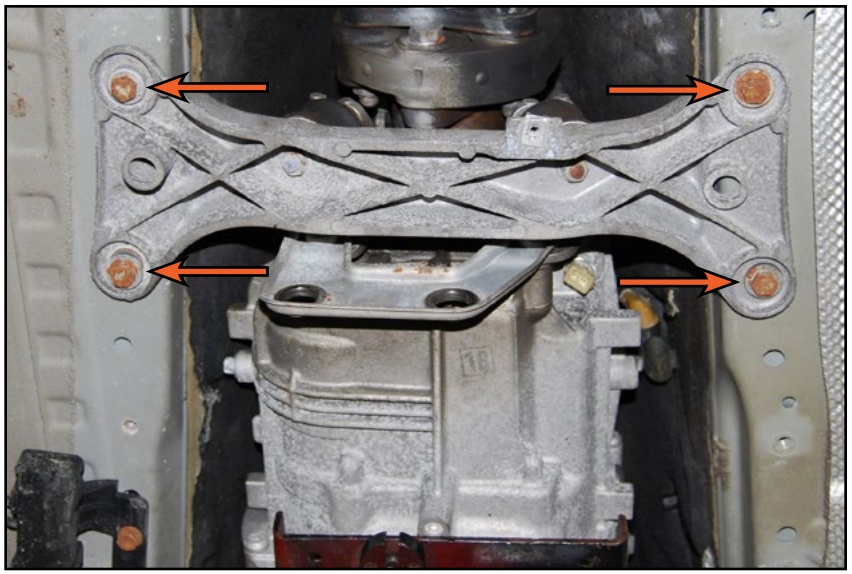
TRANSMISSION REMOVAL

Step 43: Flat Blade Screwdriver

Disconnect the turbo outlet hose from the intercooler so it will not be stretched when lowering the transmission (aftermarket style of hose shown here).

Step 44: Transmission Jack, 13mm Socket & Ratchet

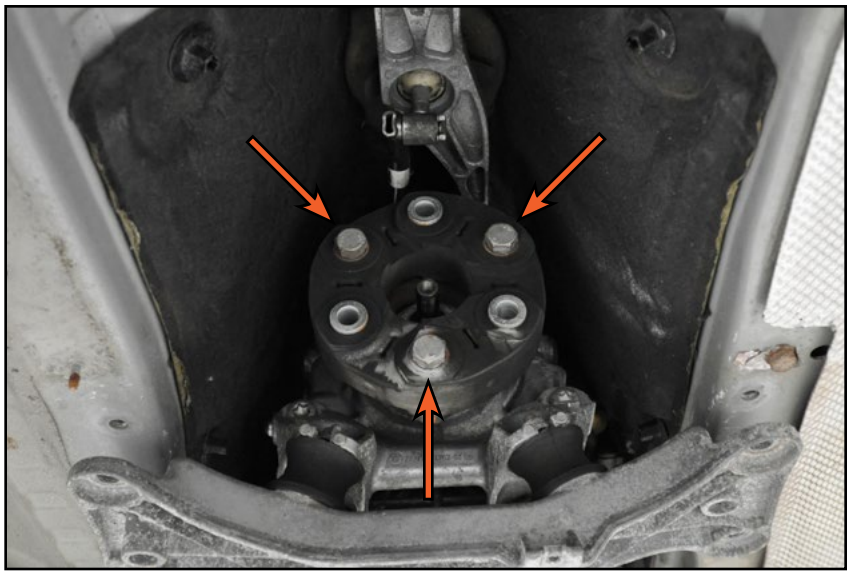
Position a transmission jack underneath and raise it up until it contacts the transmission, approximately in the center. Remove the four transmission crossmember bolts and lower the transmission so the cross member drops away from the body by about 2".



TRANSMISSION REMOVAL

Step 45: 18mm Open/Boxed End Wrenches

Remove the three bolts holding the rubber flex coupler to the transmission output flange, and pull the coupler off the flange.

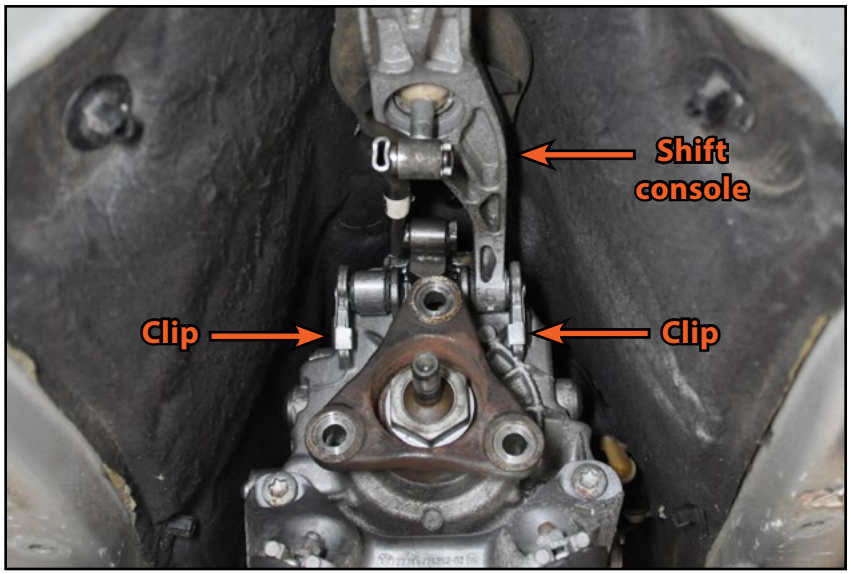


NOTE

You may need to gently lever the flex coupler off of the output flange due to three dowels which keep it aligned and sometimes cause it to be "stuck".

Step 46:

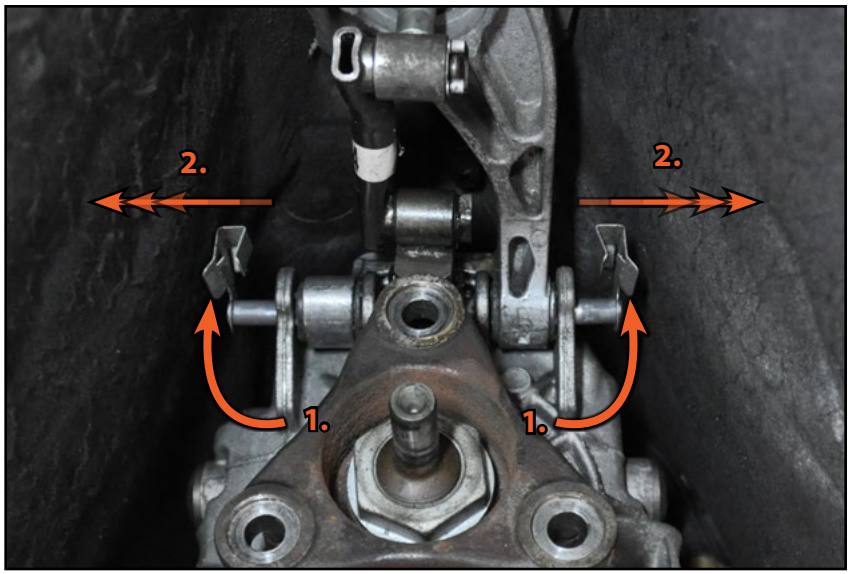
With the flex coupler removed, you will be able to access the shifter for removal. Locate the two clips that hold the main shift console in place.



TRANSMISSION REMOVAL

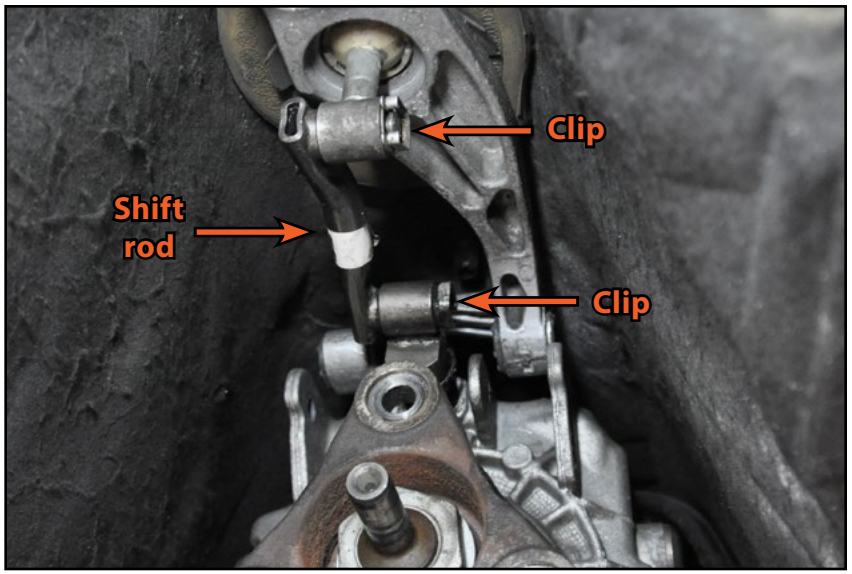
Step 47: Small Pick Tool

First, pry the clips up off of the ribs on the transmission, then second, slide them to the sides and pull them completely out.



Step 48: Small Flat Blade Screwdriver or Small Pick Tool

Remove the two clips holding the shift rod in place, then slide the shift rod out and remove it.



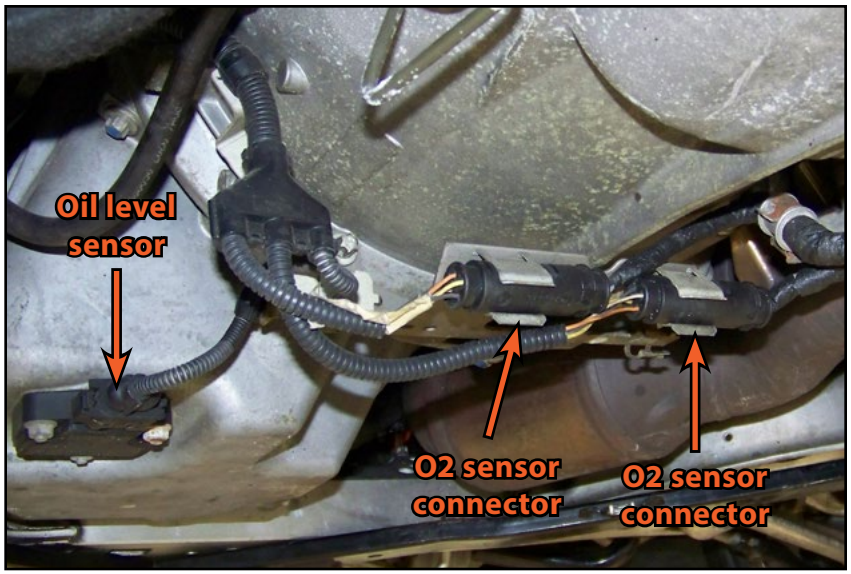
TRANSMISSION REMOVAL

Step 49:

Pull the wiring harness clip off the harness bracket on the side of the transmission.

Step 50: Small Flat Blade Screwdriver

Unplug the oil level sensor electrical connector, then pull both oxygen sensor connectors out of their support brackets and disconnect them. Move the main harness assembly off to one side and secure it out of the way.



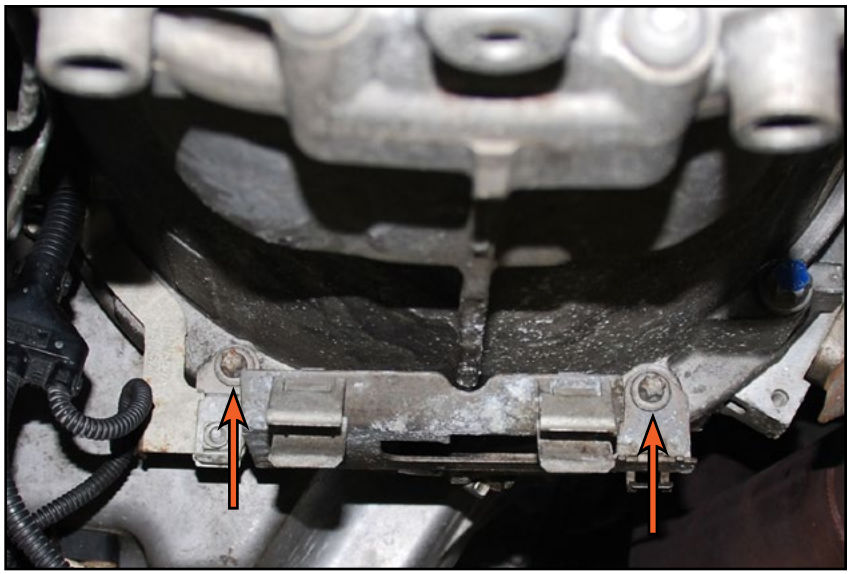
TECH TIP

Use colored tape or zip ties to mark the matching sides of the oxygen sensor connectors.

TRANSMISSION REMOVAL

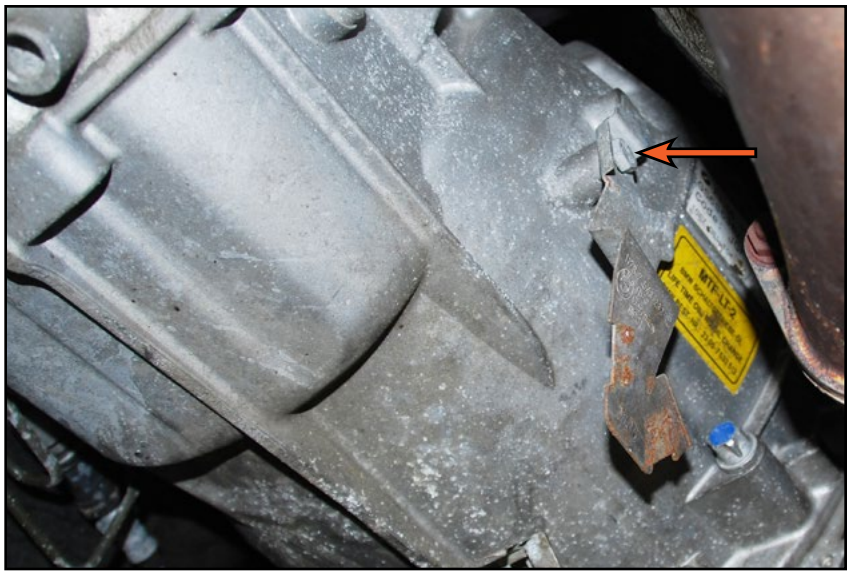
Step 51: E10 Socket & Ratchet

Remove the two securing bolts (#'s 3 and 4 on the bell housing bolt chart) and remove the lower wiring harness bracket from the bottom of the bell housing.



Step 52: 13mm Socket & Ratchet

Remove the securing bolt and remove the wiring harness bracket from the side of the transmission.



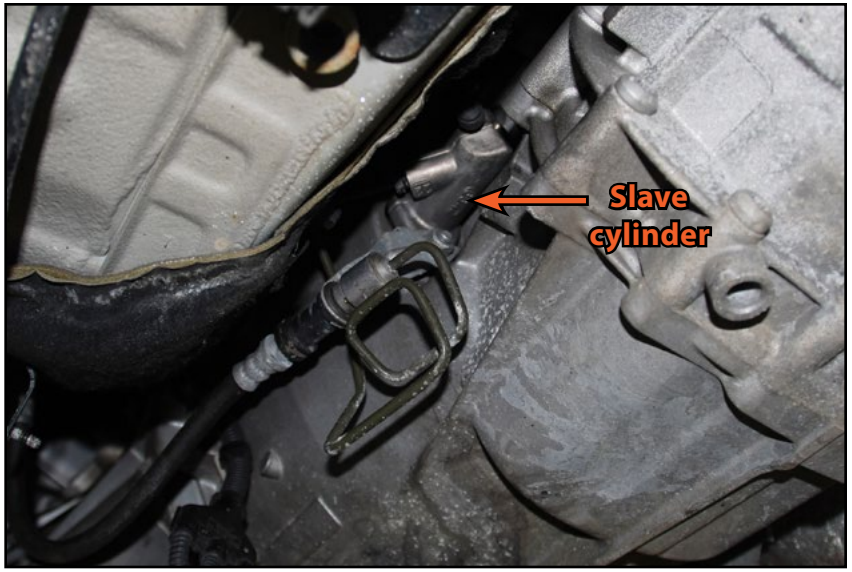
TRANSMISSION REMOVAL

Step 53:

Disconnect the reverse light switch and pull the harness out of the clips on the top of the transmission (see component locations on page 9).

Step 54: 13mm Socket, Ratchet & Extension

Unbolt the slave cylinder from the side of the transmission, then secure it off to the side so it does not hang its weight on the hose.



CAUTION: Do not depress the clutch pedal with the slave cylinder removed from the transmission.

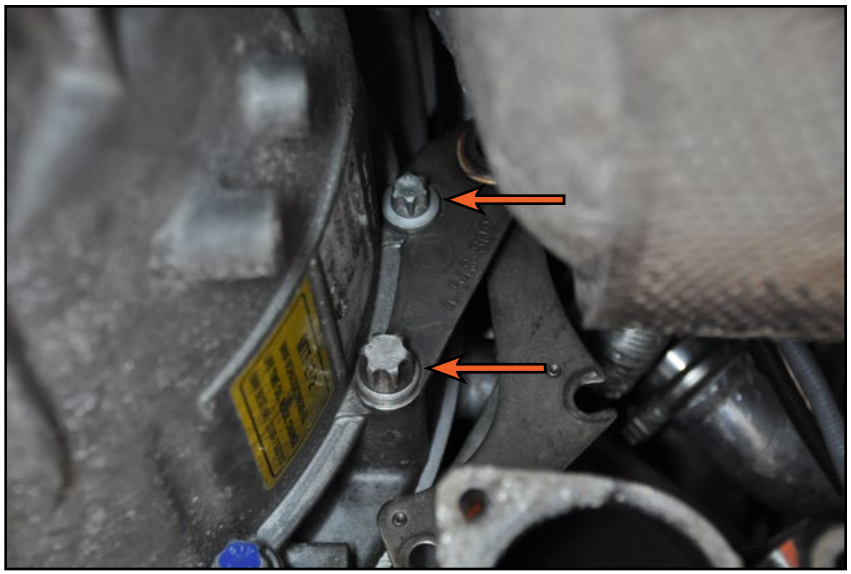
TRANSMISSION REMOVAL

Step 55:

Insert two 2x4 blocks in between the front sway bar and the bottom of the oil pan. You may have to lower the transmission jack slightly and pull down on the back of the transmission to slip them in place. These will keep the engine from falling forward when the transmission is removed.

Step 56: E14 or E18 Torx Socket & Ratchet

Remove bell housing bolts 5 and 6 on the bolt location chart. These bolts will also secure a downpipe bracket to the bell housing. If you have OE downpipes, you will need to remove the bracket from the downpipes as well.



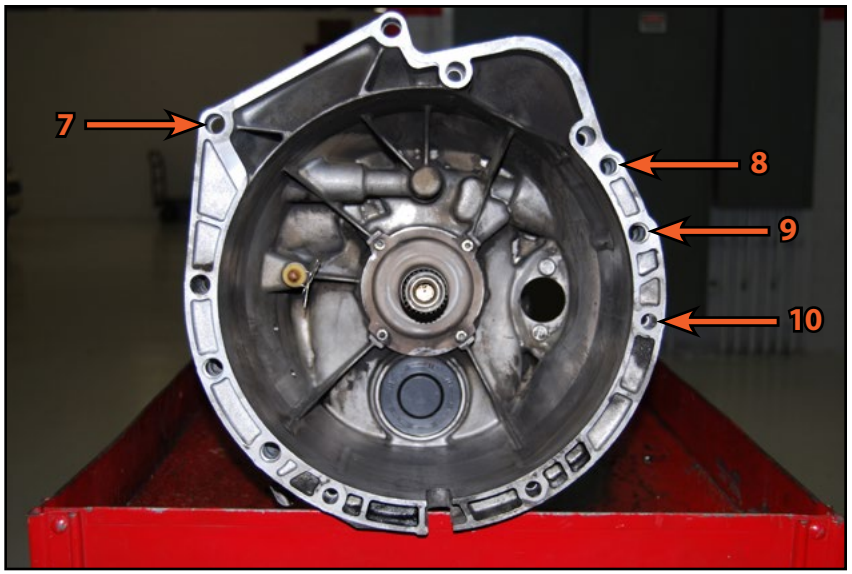
NOTE

The original bell housing bolts in these locations are aluminum and require an E18 Socket. Replacement bolts are steel and require an E14 socket. Your vehicle may be equipped either way depending on past service.

TRANSMISSION REMOVAL

Step 57: E10, E14, E18 Sockets & Ratchet

Make sure the transmission jack is located securely underneath the transmission. Remove bell housing bolts #7, #8, #9, and #10. You will generally have to use a number of different extensions and a universal joint in order to access these bolts, but you'll find that overall it's not too difficult.



STOP

You are almost ready to remove the transmission. Be sure to enlist the help of a friend. The transmission is very heavy and you will need help to steady it and transfer it to a work surface.

Step 58: E14 or E18 Socket & Ratchet

Remove bolt #11. Slide the transmission rearward just far enough for the input shaft to clear the clutch assembly, then lower the transmission down and transfer it to a work surface.

NOTE

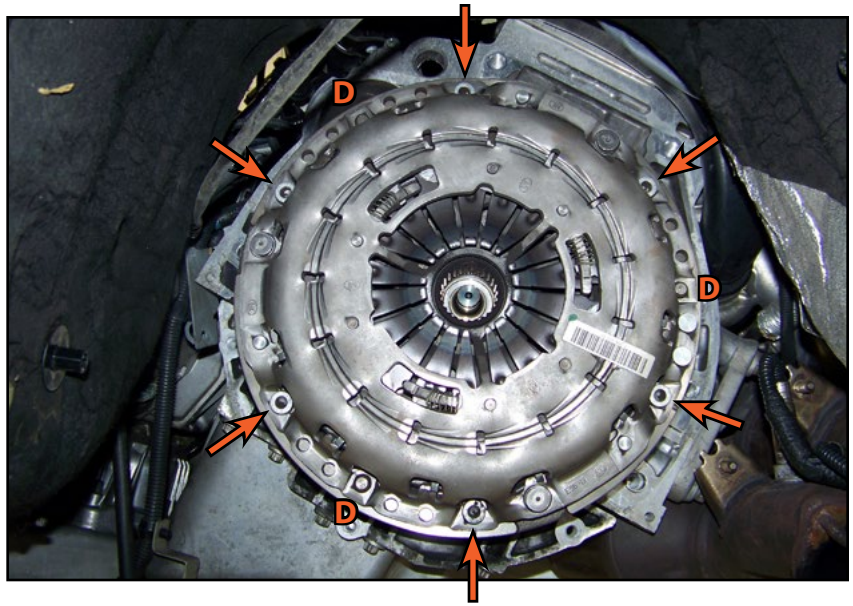
Locating dowels between the bell housing and engine block may require you to lever the two apart using a large flat blade screwdriver or pry bar.

REMOVING THE ORIGINAL FLYWHEEL AND CLUTCH

Step 1: 6mm Hex Bit Socket, Ratchet & Flat Blade Screwdriver

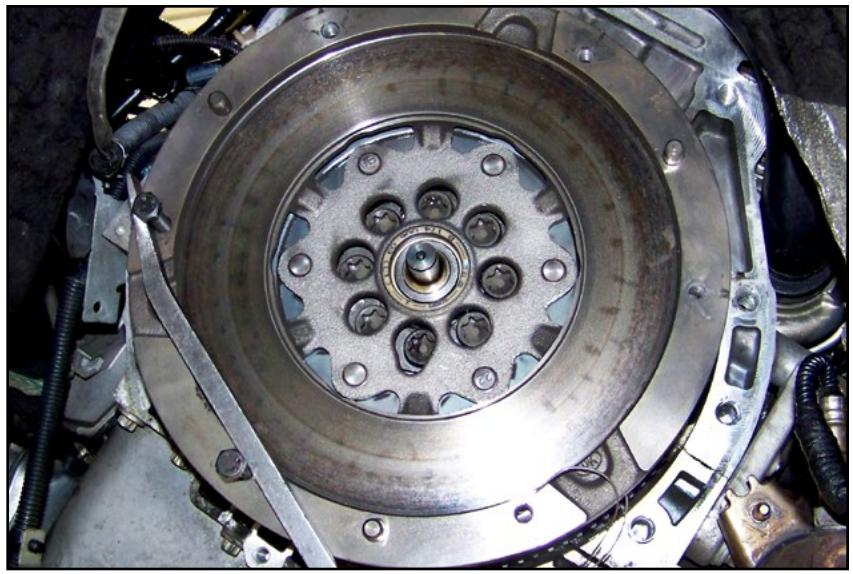
READ ENTIRE STEP FIRST

Loosen, but do not remove all six pressure plate bolts (arrows). Next, keep a flat blade screwdriver within reach, then place one hand on the pressure plate to keep it in place and remove all six bolts in an alternating pattern. Now, using both hands, slowly pull the pressure plate off of the flywheel dowel pins (D). As you pull it off, make sure that you grab the clutch disc so it does not fall and remove it along with the pressure plate. You may have to pry the pressure plate off the dowel pins (D) using a flat blade screwdriver. Depending on whether the pressure plate bolts are original or not, the socket size required for removal may vary.



Step 2: T60 Torx Socket & Ratchet

Loosen all eight flywheel bolts, then remove seven of them. Firmly grip the flywheel and remove the last bolt, then pull the flywheel off the end of the crankshaft.



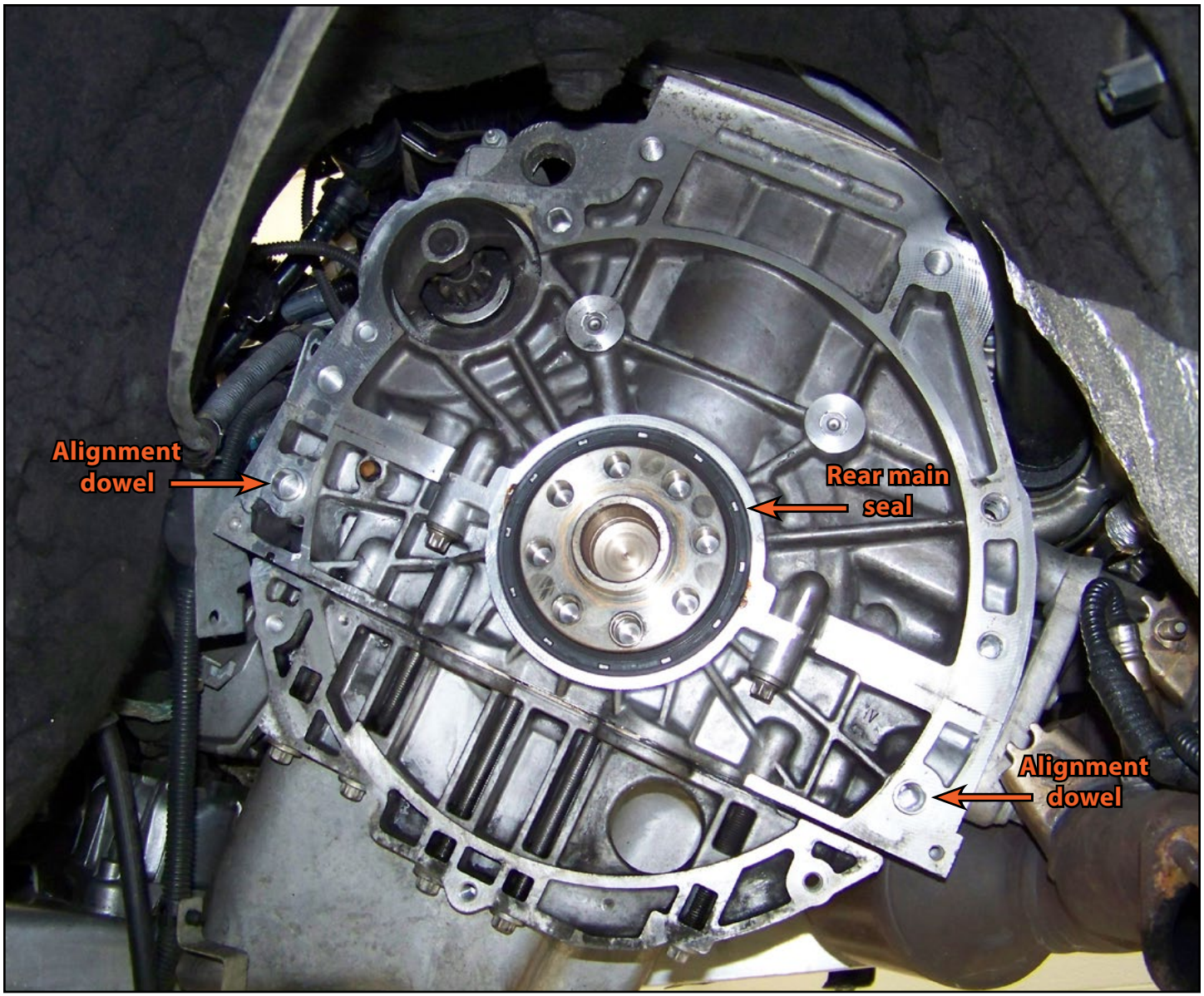
TECH TIP

An impact can be used to easily remove the flywheel bolts. If you do not have an impact, thread two of the old pressure plate bolts back into place and lever a pry bar between them to keep the engine from turning while you break the flywheel bolts loose.

CLEANING THE ENGINE BLOCK

Step 1:

Thoroughly clean the end of the crankshaft and engine block. Closely inspect the rear main seal for any signs of leakage, replacing it if necessary. Make sure that both alignment dowels are located in the block in the locations shown. If not, they are probably stuck in the bell housing. Locate them and reinstall them in the block.

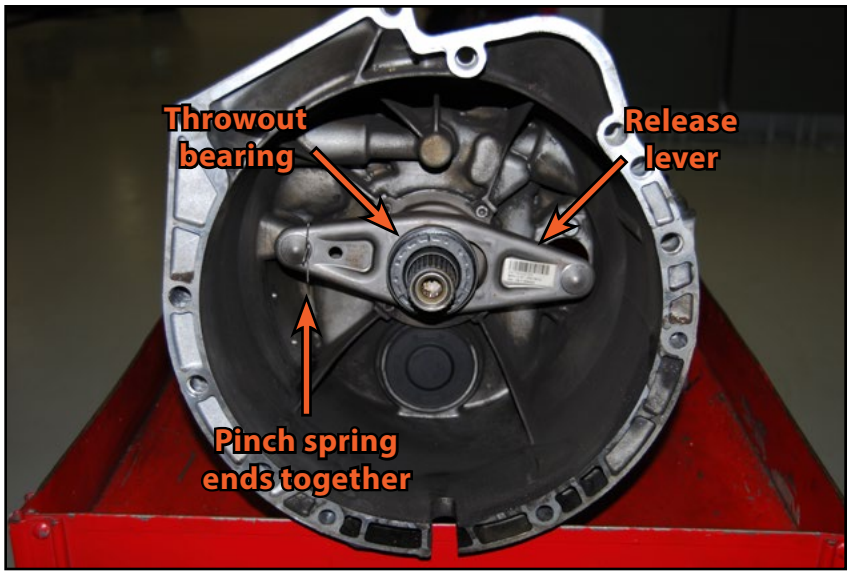


PREPARING THE TRANSMISSION FOR CLUTCH/FLYWHEEL INSTALLATION

Step 1:

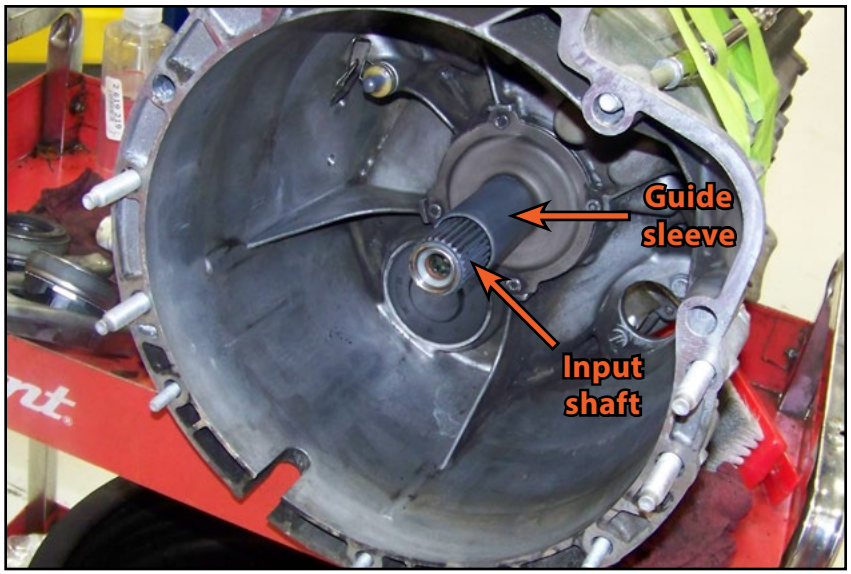
Remove the release lever and throwout bearing together using the following procedure:

1. Pinch the ends of the clutch release arm pivot spring together with your thumb and forefinger.
2. Slide the release arm and throwout bearing off of the throwout bearing guide sleeve.
3. Pull the release arm out of the pivot spring.



Step 2:

Thoroughly clean the inside of the bell housing, the throwout bearing guide sleeve, and the input shaft splines.



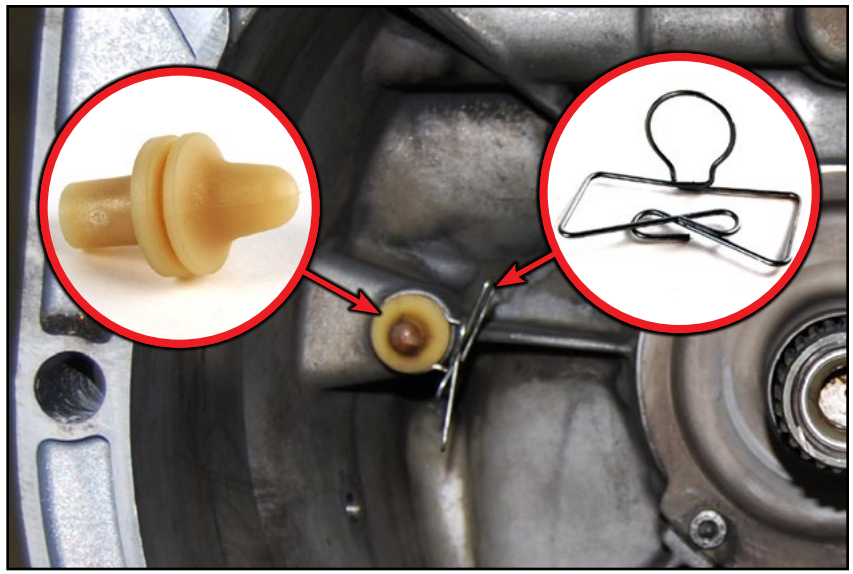
PREPARING THE TRANSMISSION FOR CLUTCH/FLYWHEEL INSTALLATION

Step 3:

The retaining spring for the release arm should remain installed on the ball pin as shown. If it came off with the release arm, reinstall it onto the ball pin.

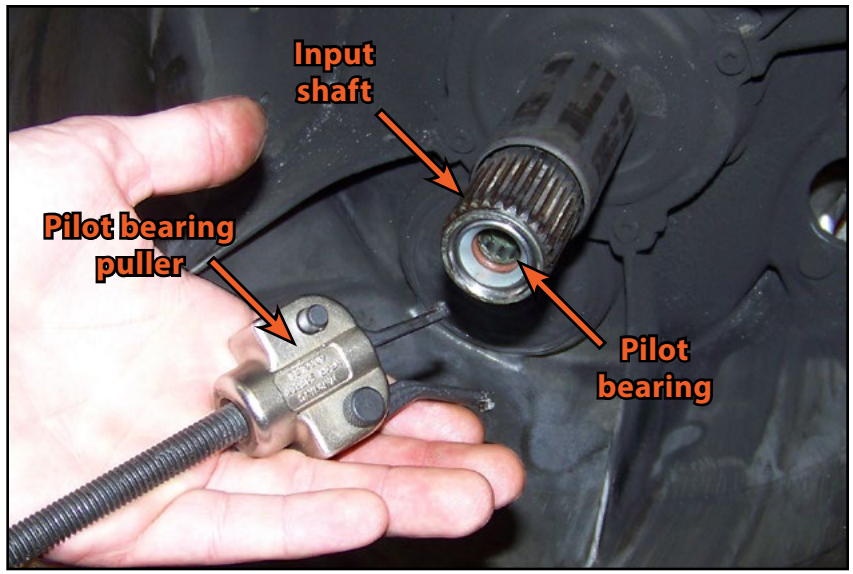
Also closely inspect the ball pin for wear. Compare the end of your ball pin to the picture of the new one. If yours is worn down, now is a good time to replace it.

- A new ball pin can be found HERE.
- A new release lever retaining spring can be found HERE.



Step 4: Pilot Bearing Puller

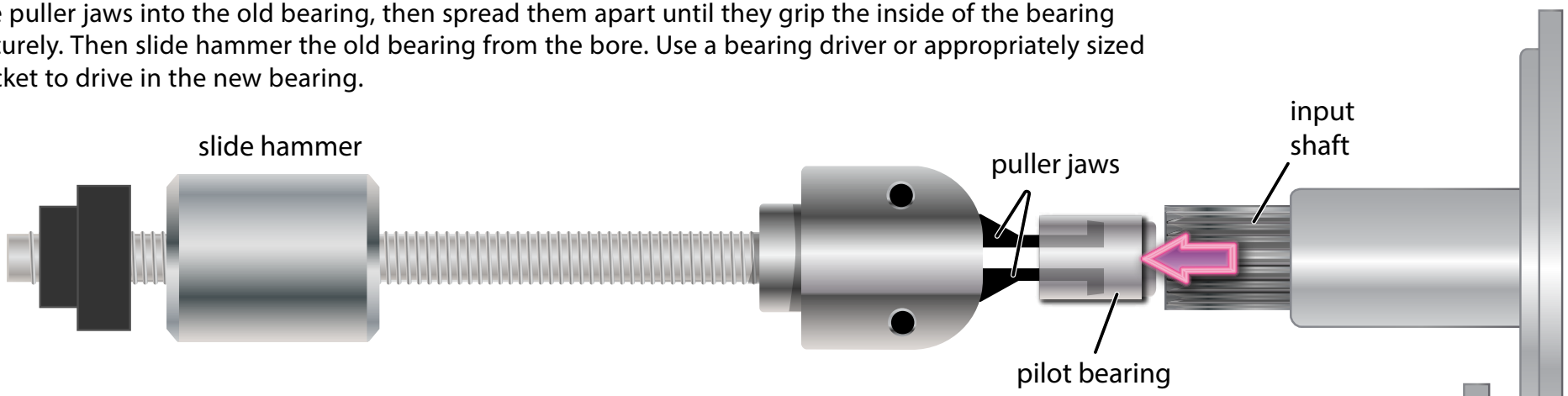
Replace the pilot bearing in the end of the transmission input shaft. A new one is included with the kit. This is easily accomplished if you have a pilot bearing puller. Proceed to the next page for more information.



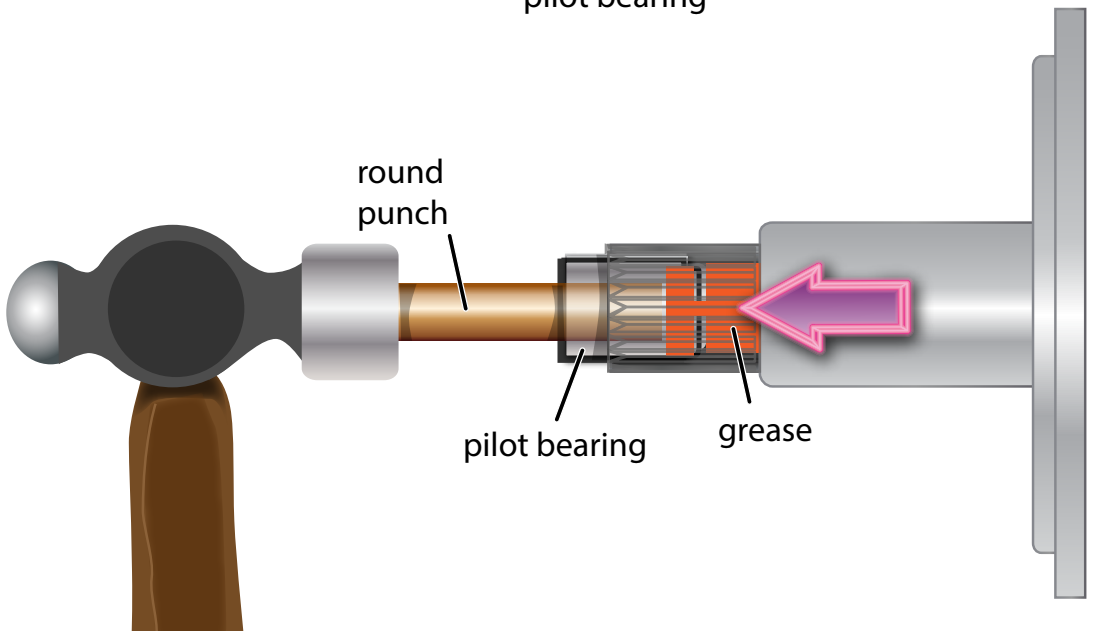
PREPARING THE TRANSMISSION FOR CLUTCH/FLYWHEEL INSTALLATION

Pilot Bearing Removal:

Remove the old bearing with a pilot bearing removal tool attached to the end of a slide hammer. Insert the puller jaws into the old bearing, then spread them apart until they grip the inside of the bearing securely. Then slide hammer the old bearing from the bore. Use a bearing driver or appropriately sized socket to drive in the new bearing.



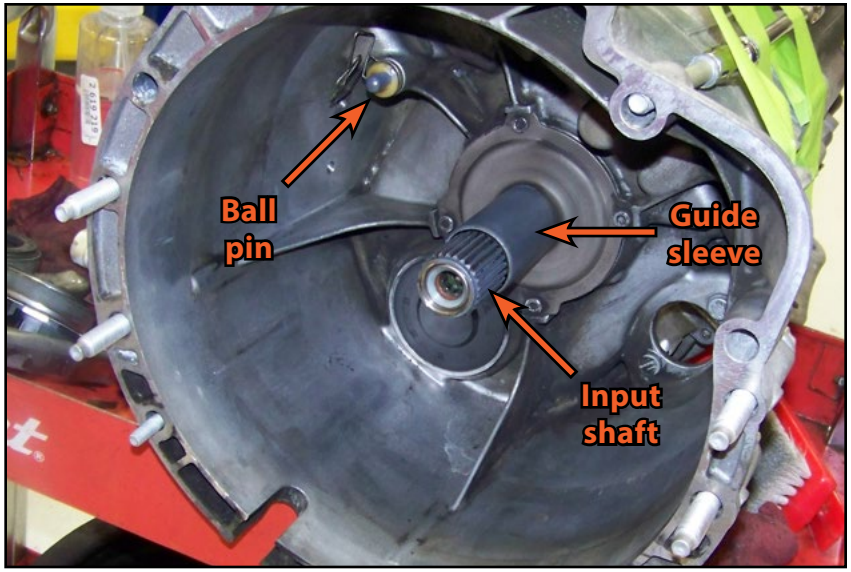
If you don't have a puller, try filling the inside of the bearing bore with grease. Then insert a round punch, slightly smaller in diameter than the bearing bore. Strike the punch with a hammer. This forces the grease under pressure through the small hole in the bearing cap into the blind hole. The pressure will push the old bearing out of the bore.



PREPARING THE TRANSMISSION FOR CLUTCH/FLYWHEEL INSTALLATION

Step 5:

Inspect the input shaft and guide sleeve for wear, lubricate the ball pin with a light grease, then sparingly lubricate the input shaft with clutch spline grease.



Step 6:

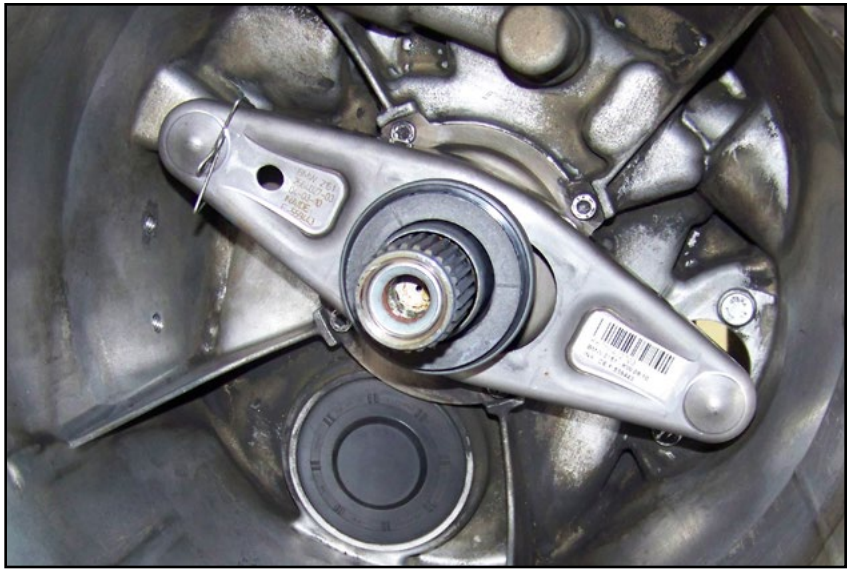
Being very careful not to get any grease or oil onto the friction face, test fit the clutch disc onto the input shaft. Slide it in and out a few times to make sure it moves freely without any sticking or binding. Any sticking or binding here can lead to engagement or disengagement issues, and must be corrected now.

When you are satisfied the disc moves freely on the input shaft, remove it and lay it aside in a clean place until the new flywheel is installed.

PREPARING THE TRANSMISSION FOR CLUTCH/FLYWHEEL INSTALLATION

Step 7:

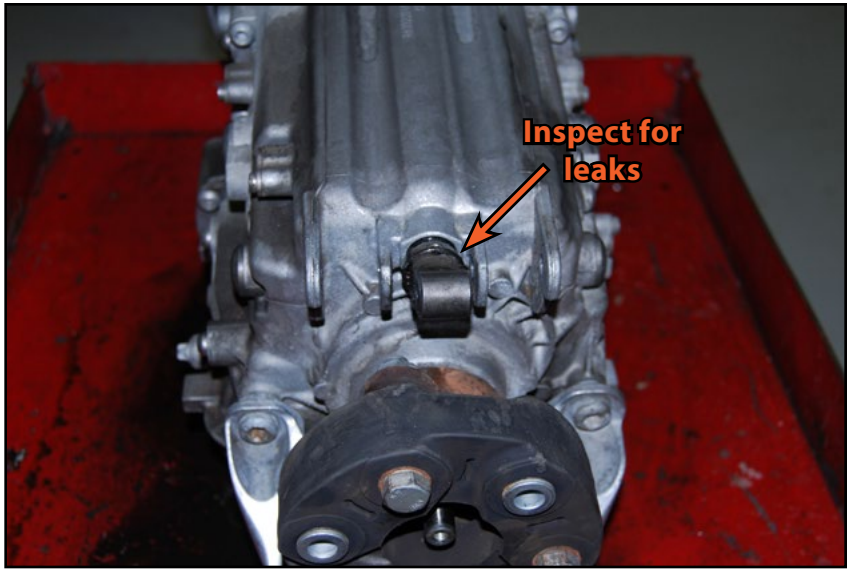
Install the new throwout bearing onto the new clutch release arm, then slide them over the guide sleeve and install the release arm through the pivot retaining spring and onto the ball pin. Push in on the release arm at the ball pin to hold it in place, then pivot the release arm in and out to make sure it slides freely.



Step 8:

One final thing to check here: Take a look at the back of the transmission where the shifter selector shaft enters the case. This seal is a common place for leaks.

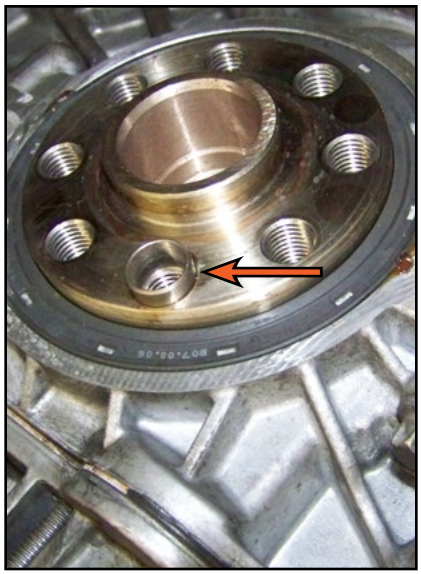
- A replacement is available on our website by clicking HERE.

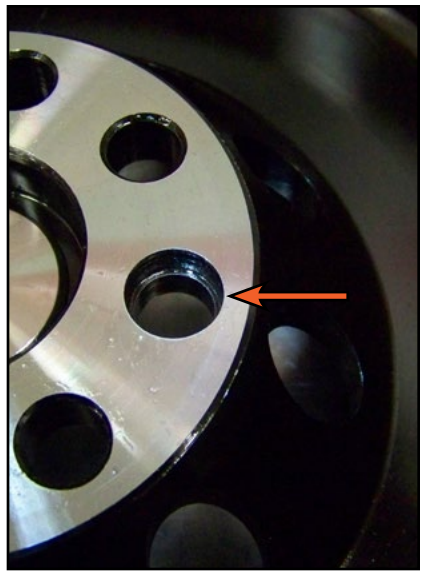


INSTALLING THE NEW FLYWHEEL AND CLUTCH

Step 1:

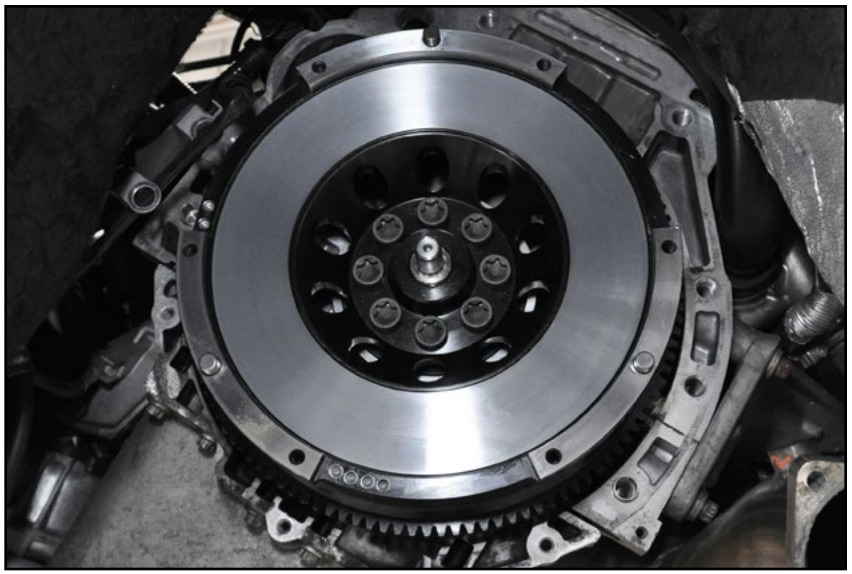
Inspect the end of the crankshaft and the center hub of the new lightweight flywheel. The crankshaft will have a locating dowel in one of the bolt holes. The flywheel will have a recess to mate up with this dowel.





Step 2: T60 Torx Socket & Ratchet

Install the flywheel into place on the end of the crankshaft, then install all eight bolts by hand in an alternating fashion to draw the flywheel down evenly onto the crankshaft. Continue to thread them in until they are fully seated.



INSTALLING THE NEW FLYWHEEL AND CLUTCH

Step 3: T60 Torx Socket & Torque Wrench

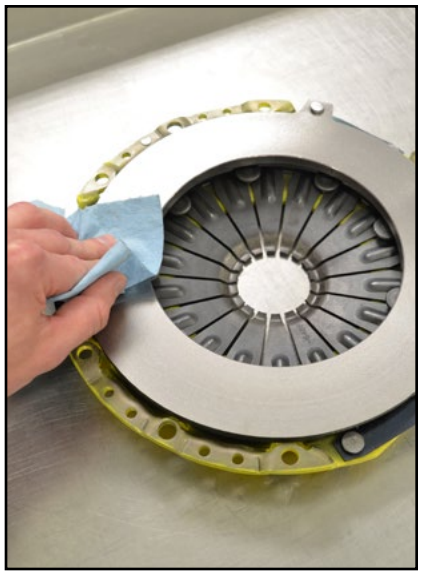
Torque the bolts in the sequence shown to 120 Nm (89 Ft-lbs). You can start with any bolt, just be sure to follow the alternating pattern shown on the right.

TECH TIP

Install two old pressure plate bolts and lever a pry bar in between to keep the flywheel from turning while torquing the bolts.

Step 4:

Wipe the surface of the flywheel and the new pressure plate using brake/parts cleaner to remove any oily residue or contaminants.



INSTALLING THE NEW FLYWHEEL AND CLUTCH

Step 5: Clutch Disc Alignment tool

Hold the clutch disc in place on the flywheel and insert the alignment tool.

NOTE

Every new clutch disc is marked with either "flywheel side", "pressure plate side", transmission side, or possibly "getriebeseite" - German for "gearbox side". Make sure the disc is properly oriented.

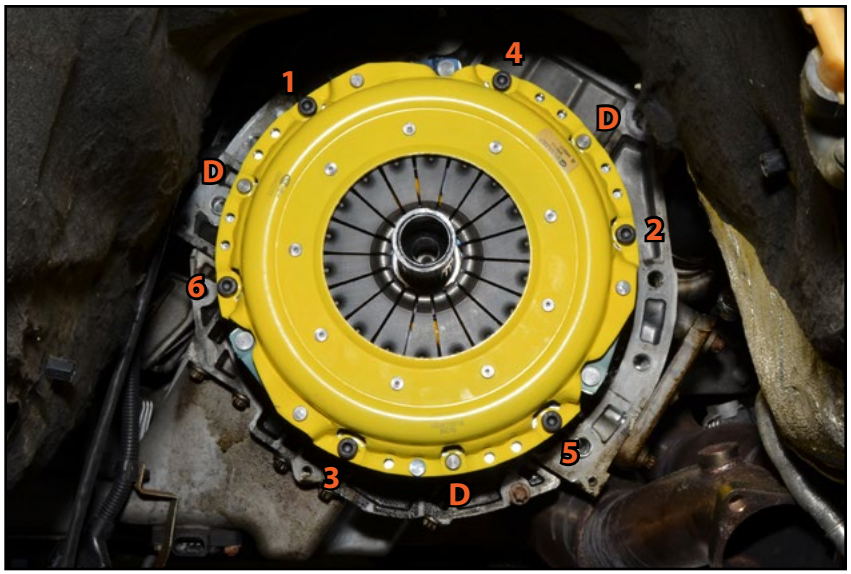
STOP

If you purchased one of the ACT clutch kits be sure to reference their installation instructions for torque specs as well as overall procedures.

Step 6: 6mm Hex Bit (Allen) Socket & Ratchet

Install the pressure plate over the alignment tool and disc, onto the flywheel. Make sure all three dowel pins (D) are lined up, then push the pressure plate into place.

Start all six pressure plate bolts, then tighten them evenly and alternately in the sequence shown on the right until they are fully seated.



Ensure that the alignment tool moves freely inside the clutch disc, this indicates that the clutch disc was not pinched in place while we were tightening the pressure plate bolts.

CAUTION: DO NOT torque the pressure plate bolts during this step, torque specifications will be provided in the next step.

INSTALLING THE NEW FLYWHEEL AND CLUTCH

Step 7: 6mm Hex Bit (Allen) Socket & Torque Wrench

If you are installing an OEM replacement clutch kit:

- New pressure plate bolts ***ARE NOT*** provided in these kits.
- These ***ARE*** torque-to-yield bolts and ***CAN NOT*** be reused.
- Replacement bolts can be found by clicking HERE.
- Torque these bolts to 15 Nm (11 Ft-lbs) + 90 degrees using the sequence shown in the photo.

If you are installing one of the ACT replacement clutch kits:

- New pressure plate bolts ***ARE*** provided in these kits.
- These ***ARE NOT*** torque-to-yield bolts and they ***CAN*** be reused.
- Reference the torque tables below, then torque the pressure plate bolts in the sequence shown in the photo.

Metric Grade 10.9 Bolts:

7mm x 1.0..... 20Nm (15 Ft-lbs)
8mm x 1.0 ..... 34Nm (25 Ft-lbs)
8mm x 1.25 ..... 35Nm (26 Ft-lbs)
10mm x 1.25..... 68Nm (50 Ft-lbs)
10mm x 1.5..... 68Nm (50 Ft-lbs)

You are now ready to reinstall the transmission!

REINSTALLING THE TRANSMISSION

Installing the transmission is basically the reverse of removal, however for convenience and accuracy we have included this checklist.

- [ ] Raise the transmission, carefully line it up, and slide it into place until it is fully seated against the engine block.
- [ ] Install bell housing bolts #7, #8, #9, and #10. Don't forget the harness bracket under bolts #8 and #9.
- [ ] Double check that the transmission is seated fully and no wires are pinched between the bell housing and block.
- [ ] Install bell housing bolts #5 and #6 with the downpipe bracket underneath.
- [ ] Torque bell housing bolts #5, #6, #7, #8, #9, and #10 to the proper specification.
- [ ] Install the clutch slave cylinder and torque the nuts.
- [ ] Connect the reverse light switch and secure the harness to the ribs on the side of the transmission.
- [ ] Remove the 2x4 blocks between the oil pan and front sway bar.
- [ ] Install the wiring harness bracket on the RH side of the transmission.
- [ ] Install bell housing bolts #3 and #4 along with the lower wiring harness bracket and torque the bolts to the proper specification.
- [ ] Connect the oil level sensor and both oxygen sensors and push the O2 sensor connectors back into the lower harness bracket.
- [ ] Push the O2 harness clip back onto the bracket on the RH side of the transmission.
- [ ] Install the shift rod and clips.
- [ ] Install the shifter console and retaining clips.

REINSTALLING THE TRANSMISSION

- [ ] Install the flex coupler and torque the bolts to the proper specification.
- [ ] Raise the transmission, install the crossmember bolts and torque them to the proper specification.
- [ ] Connect the turbo outlet hose.
- [ ] Install the driveshaft onto the flex coupler and torque the bolts to the proper specification.
- [ ] Install the driveshaft center support - ( see the warning on Page 30) and torque the bolts to the proper specification.
- [ ] Install the tunnel heat shield.
- [ ] Install the exhaust system and front exhaust support bracket.
- [ ] Install the rear body V-brace.
- [ ] Install the lower insulation panels.
- [ ] Connect the upper intercooler pipe.
- [ ] Install the upper bell housing bolts and torque them to the proper specification.
- [ ] Install the air box and cowl panel.
- [ ] Connect the battery.

Your installation is now complete!

TORQUING TIPS

Torque to Yield or "Stretch" Bolts

Many bolts will have a torque specification listed in the format - xx Nm (xx Ft-lbs) + xx degrees. These bolts are torque to yield bolts, commonly referred to as "stretch" bolts. The correct procedure for torquing these bolts is:

Stage One - Torque the bolt(s) to the initial Nm or Ft-lb specification. If there is more than one, be sure to torque them in the correct sequence.
Stage Two - Tighten or "stretch" the bolt(s) the additional specified number of degrees. If there is more than one, be sure to follow the correct sequence.

Note - Some bolts may have two or more stages of torquing before the final stage of "stretching" the bolts.

When tightening more than one bolt in a specified sequence, be sure to mark each fastener with paint ***immediately*** after performing the final stage or "stretching" of the bolts. This will ensure that you keep track of which bolts have already been "stretched".

All Torque to Yield bolts should only be used once and should be replaced each time they are removed. If they are reused, they will not be able to achieve the proper clamping force with the specified torque.

Lubrication

Torque specifications are always listed for a dry fastener (***no*** lubrication) unless specified otherwise.

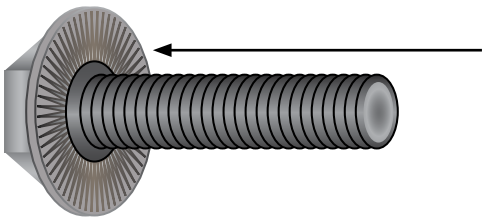
Some fasteners require lubrication on the threads -or- on the contact surface while torquing. These fasteners will be listed with the specific location and type of lubrication required. Always follow manufacturers recommendations exactly.

Lubricating a fastener that is intended to be installed dry and then torquing it to factory specifications will increase the clamping force and stress on the fastener and components, which can result in damage or failure.

Do not lubricate the threads of any fastener unless it is specifically recommended by the manufacturer.

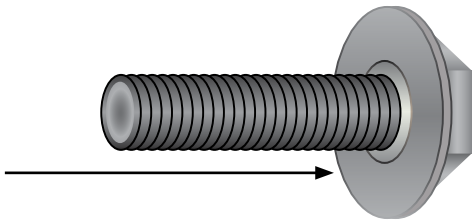
Ribbed vs. Non-Ribbed Bolts

Ribbed and Non-Ribbed bolts in the same location generally require a different torque specification.



A ribbed bolt is identified by the ribs on the contact surface

A non-ribbed bolt is identified by the smooth contact surface



TORQUE SPECIFICATIONS

Bell Housing M8 Torx (E10) Bolt ..... 22 Nm (16 Ft-lbs)

Bell Housing M10 Torx (E12) Bolt ..... 43 Nm (32 Ft-lbs)

Bell Housing M12 Torx (E14 or E18) Bolt ..... 72 Nm (53 Ft-lbs)

Driveshaft Center Support to Body ..... 21 Nm (15 Ft-lbs)

Driveshaft Flex Disc to Output Flange ..... 60 Nm (44 Ft-lbs)

Flywheel to Crankshaft. ..... 120 Nm (89 Ft-lbs)

Pressure Plate to Flywheel ..... (Reference text on Page 49)

Slave Cylinder to Transmission ..... 22 Nm (16 Ft-lbs)

Transmission Crossmember to Body ..... 19 Nm (14 Ft-lbs)

Your Turner Performance Lightweight N54 Flywheel installation is complete!

These instructions are provided as a courtesy by Turner Motorsport

Proper service and repair procedures are vital to the safe, reliable operation of all motor vehicles as well as the personal safety of those performing the repairs. Standard safety procedures and precautions (including use of safety goggles and proper tools and equipment) should be followed at all times to eliminate the possibility of personal injury or improper service which could damage the vehicle or compromise its safety.

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