



BMW S54 VANOS Exhaust Hub Upgrade Kit Installation Instructions



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.

VANOS HUB UPGRADE KIT INSTALLATION

Step 1:

Remove the airbox, radiator fan & shroud, cabin air filter housing, strut brace, engine cover, ignition coils, and valve cover.



Step 2:

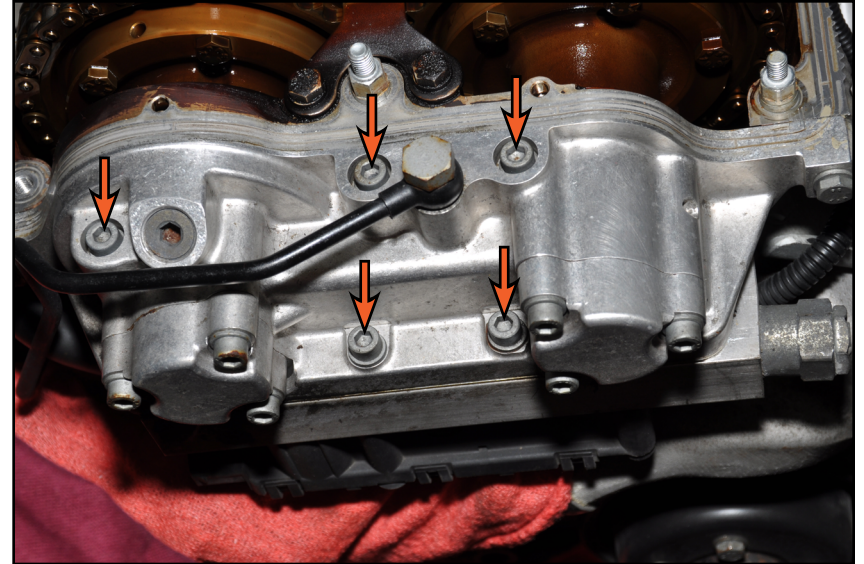
Disconnect the connector (arrow) from the solenoid pack and move the harness out of the way.



VANOS HUB UPGRADE KIT INSTALLATION

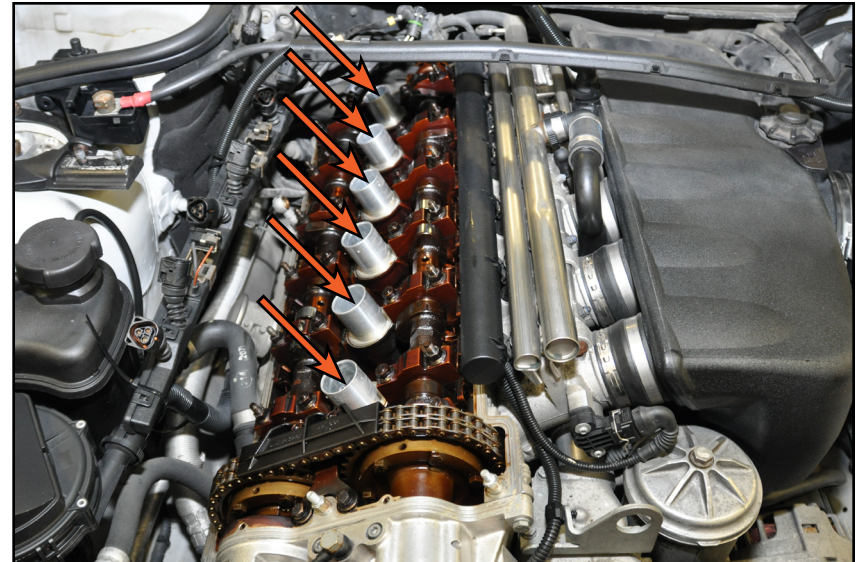
Step 3: 5mm Hex (Allen) Socket & Ratchet

Place shop rags underneath the solenoid pack to catch any leaking oil, then remove the five screws (arrows) and pull downward to remove the solenoid pack along with the sealing plate.



Step 4:

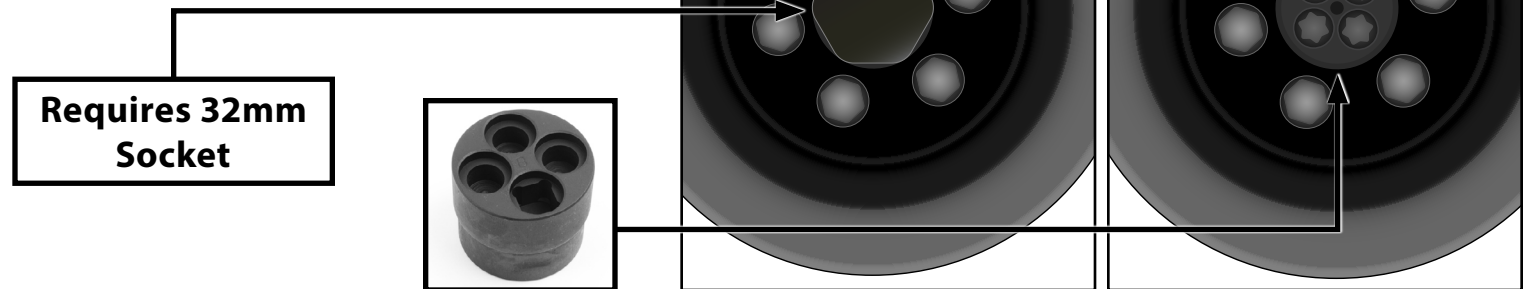
Remove the spark plugs (arrows).



VANOS HUB UPGRADE KIT INSTALLATION

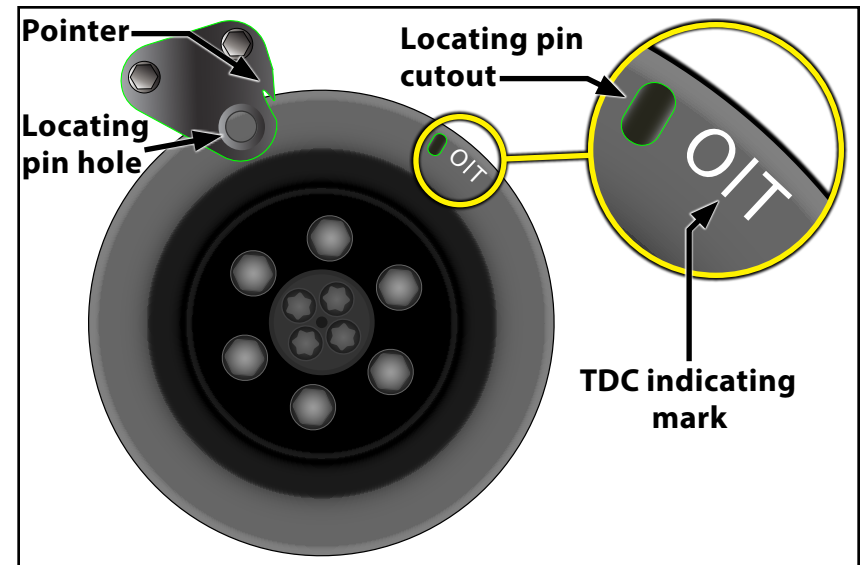
Step 5:

Inspect the front of the crankshaft pulley to determine which mounting style the pulley has; The large hex style mounting bolt (as shown in **Photo #1**) will require a 32mm socket, and the four torx bolts (as shown in **Photo #2**) will require the specialty socket that is included in the S54 camshaft alignment tool kit.



Step 6:

The crankshaft pulley has a line that indicates top dead center, and a small recessed cutout for the crankshaft locating pin. Locate these marks and the fixed pointer that is located in approximately the 11 o'clock position. The pointer also has a hole in it to accept the crankshaft locating pin.

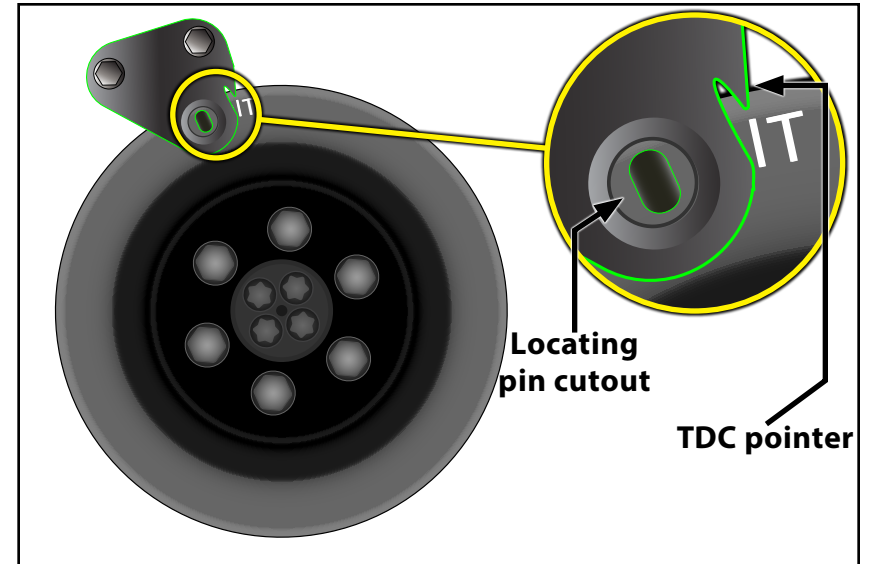


VANOS HUB UPGRADE KIT INSTALLATION

Step 7: 32mm Socket -OR- Specialty Socket & Ratchet

Rotate the engine in a clockwise direction until the TDC pointer is lined up with the TDC indicating mark on the crank pulley. In this position, the locating pin cutout will be centered perfectly in the hole in the pointer.

It is OK to rotate the crankshaft counter clockwise in order to line up the marks. Insert the crankshaft locating pin into the hole in the pointer and into the crankshaft pulley. Make sure that the end of the pin is fully seated into the crank pulley.

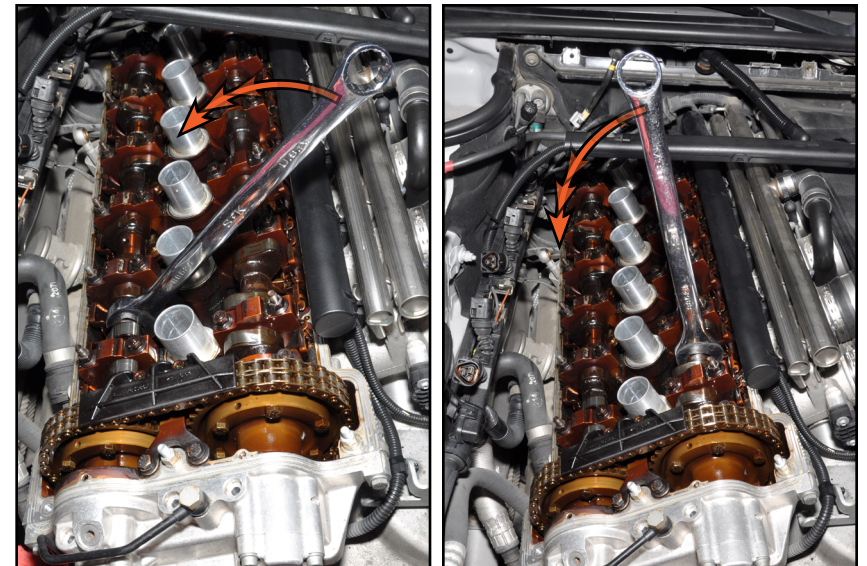
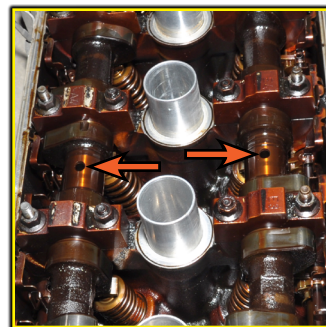


Step 8: 24mm Wrench

Using the hex section on each camshaft, rotating both camshafts counter clockwise. Doing this causes the transfer gear to fully extend out the front of the vanos hub, making it easier to disconnect it from the vanos piston.



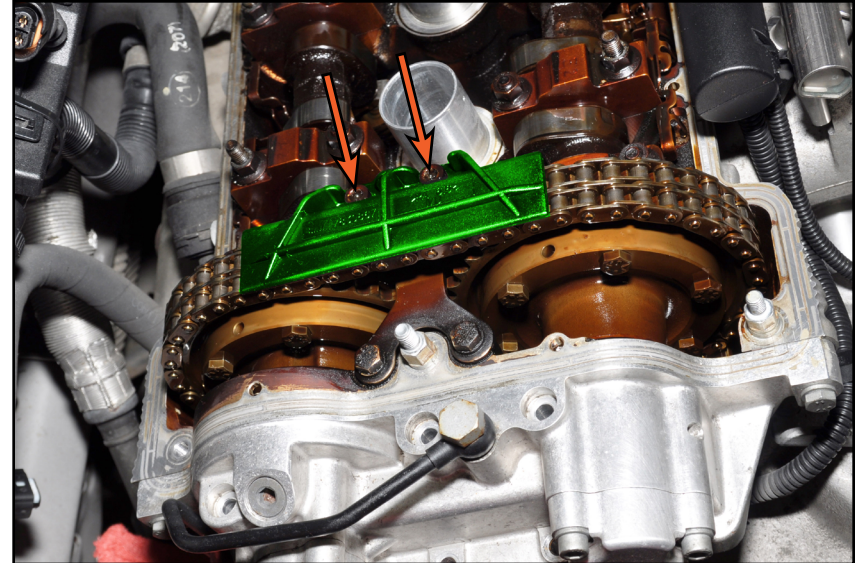
There is a hole (arrows) in each camshaft between cylinders 2 and 3. When both cams are fully retarded, the holes will be facing upward in approximately a 90 degree angle to the cylinder head.



VANOS HUB UPGRADE KIT INSTALLATION

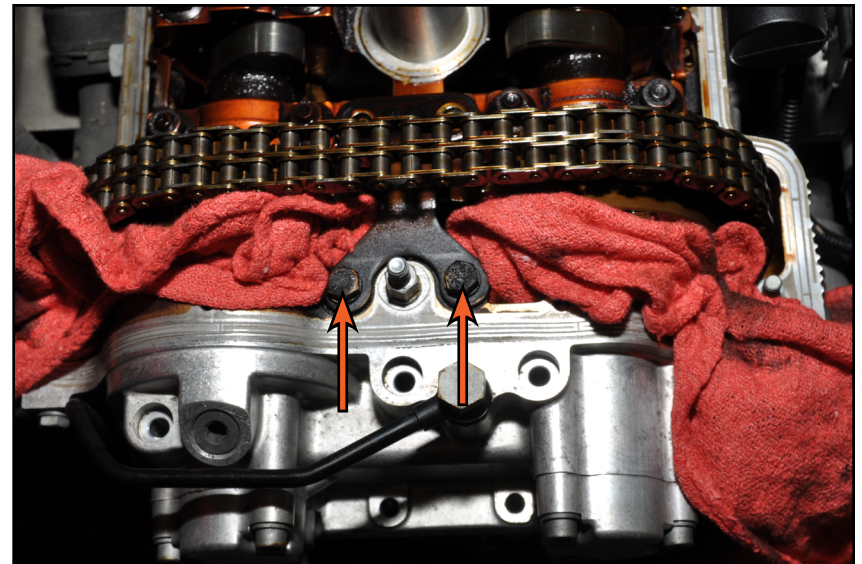
Step 9: 5mm Hex (Allen) Socket & Ratchet

Remove the two screws (arrows) and remove the camshaft chain guide (highlighted in **GREEN**).



Step 10: 10mm Socket & Ratchet

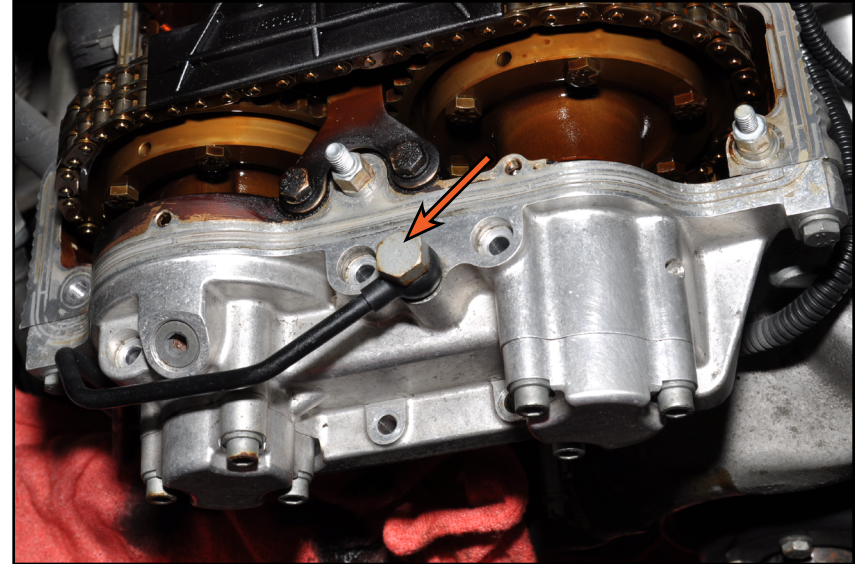
Cover the area between the vanos hubs and piston housing to prevent debris from dropping into the engine, then remove the two screws (arrows) and remove the vanos bracket.



VANOS HUB UPGRADE KIT INSTALLATION

Step 11: 10mm, 14mm Socket & Ratchet

Remove the banjo bolt (arrow) holding the oil pipe to the top of the vanos piston housing, then remove the 10mm bolt that holds the oil pipe to the front of the engine and move the oil pipe out of the way.



Step 12: 5mm Hex (Allen), 10mm Socket & Ratchet

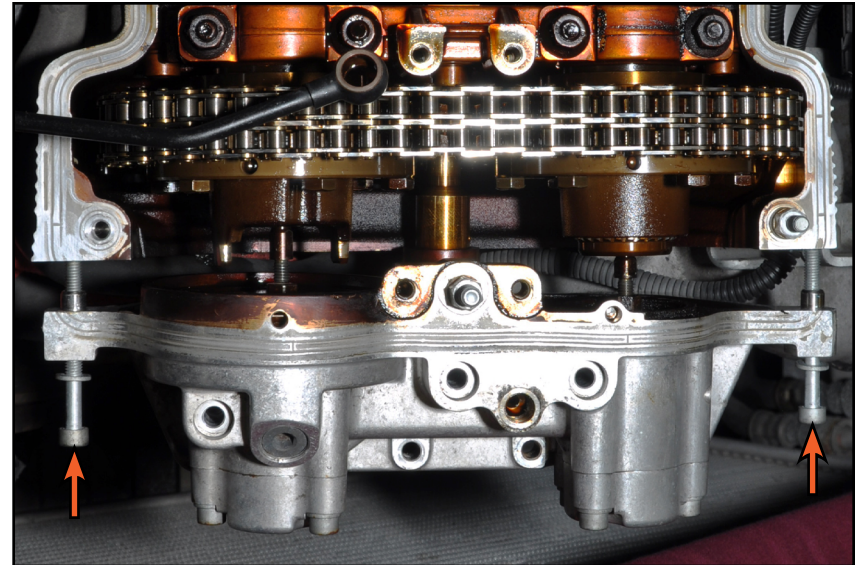
Remove the five screws (arrows) that secures the vanos piston housing to the engine.



VANOS HUB UPGRADE KIT INSTALLATION

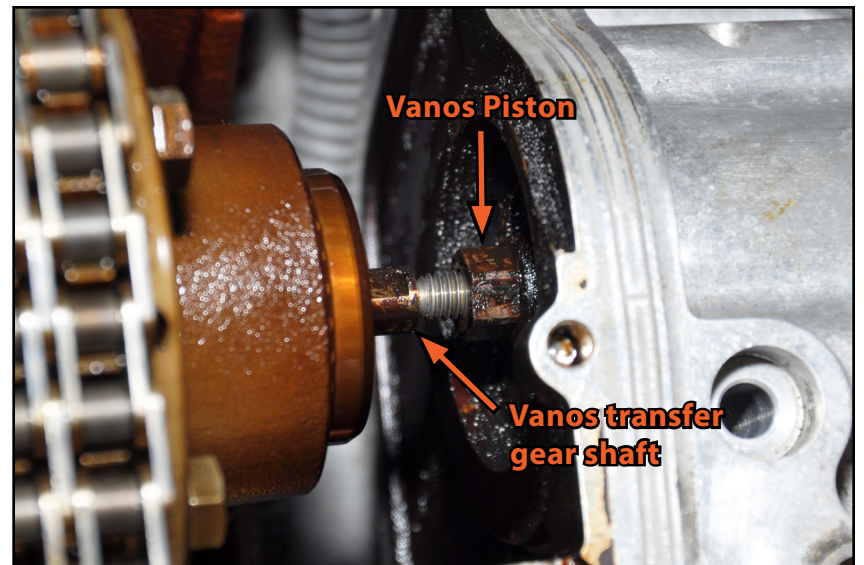
Step 13:

Reuse the two longest screws (arrows) from the solenoid pack and install them through the upper mounting holes of the vanos piston housing to help support it as you disconnect the transfer gear sets in the next step.



Step 14: 7mm, 10mm Wrench

Counterhold the 10mm vanos piston, and unthread the 7mm vanos gear shaft to disconnect both transfer gear sets from the vanos pistons. These are **LH thread**, so you will loosen them in the **opposite** direction as normal. Remove the two support screws, then remove the vanos piston housing from the engine.



VANOS HUB UPGRADE KIT INSTALLATION

Step 15:

Thoroughly cover and mask off the entire engine area, leaving only the two tabs on the exhaust vanos hub exposed as shown.



Step 16: Die Grinder & Cut-off Wheel

Carefully cut off the two tabs (highlighted in **RED**) on the end of the exhaust vanos hub, leaving them completely flush with the surface of the hub.



VANOS HUB UPGRADE KIT INSTALLATION

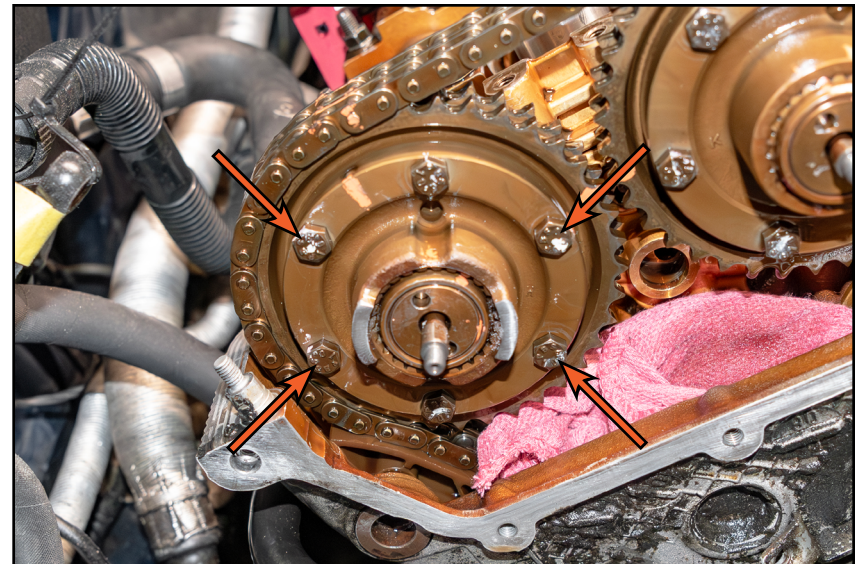
Step 17: Metal File

File down the tab area until the surface is completely flush and smooth, then thoroughly clean the area to remove any metal fragments before removing the masking.



Step 18: 10mm Socket & Ratchet

Remove the four bolts (arrows), leaving the two remaining screws perpendicular to the tabs fully installed.



VANOS HUB UPGRADE KIT INSTALLATION

Step 19: 10mm Socket & Torque Wrench

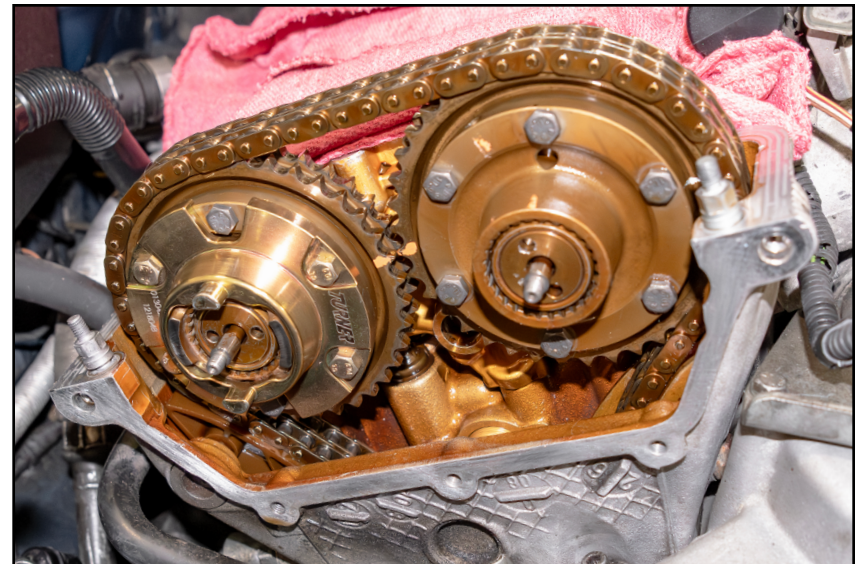
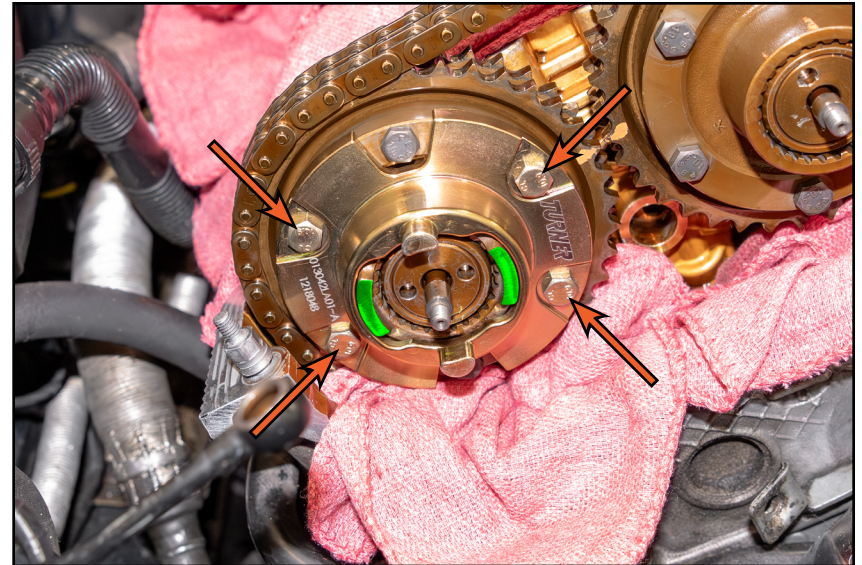
Install the new vanos hub into place as shown, then install the provided M6 x 30mm screws (arrows), torquing them to 14 Nm (10 Ft-lbs).



Inspect the cut tab area (highlighted in **GREEN**) to ensure it is flush with the face of the new hub, or slightly recessed. Remove the hub and remove additional material if needed.

Step 20:

Thoroughly clean the vanos piston housing mating area on the front of the engine to remove any debris or residue.



VANOS HUB UPGRADE KIT INSTALLATION

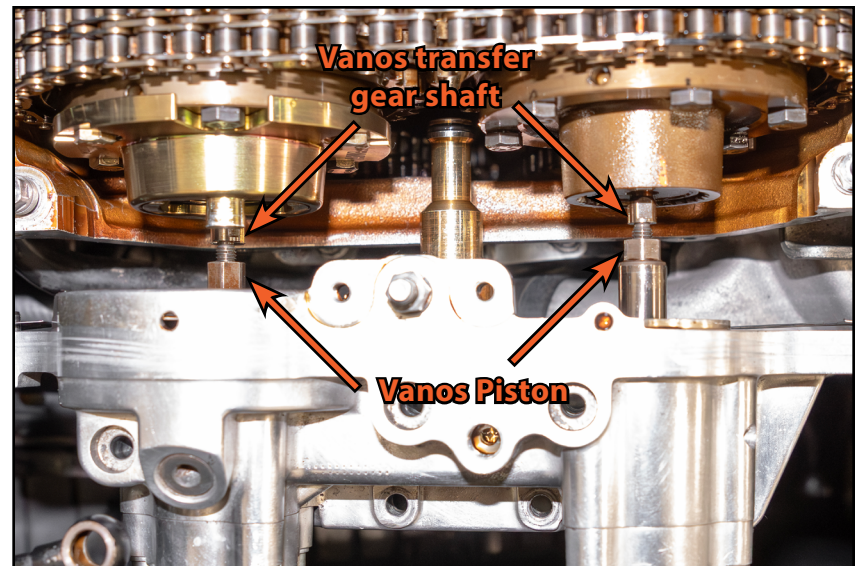
Step 21:

Replace the vanos piston housing gasket, thoroughly cleaning the mating area to remove any debris or residue.



Step 22: 7mm, 10mm Wrench

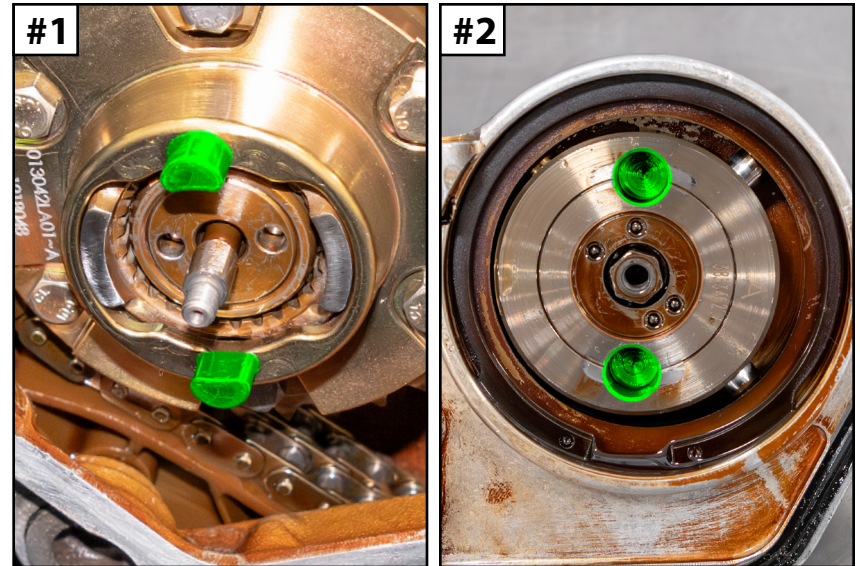
Guide the vanos piston housing back into place and loosely thread in the two support screws through the upper mounting holes of the vanos piston housing to help support it. Counterhold the 10mm vanos pistons, and thread in the 7mm vanos gear shafts, tightening until lightly snug. These are **LH thread**, so you will tighten them in the **opposite** direction as normal.



VANOS HUB UPGRADE KIT INSTALLATION

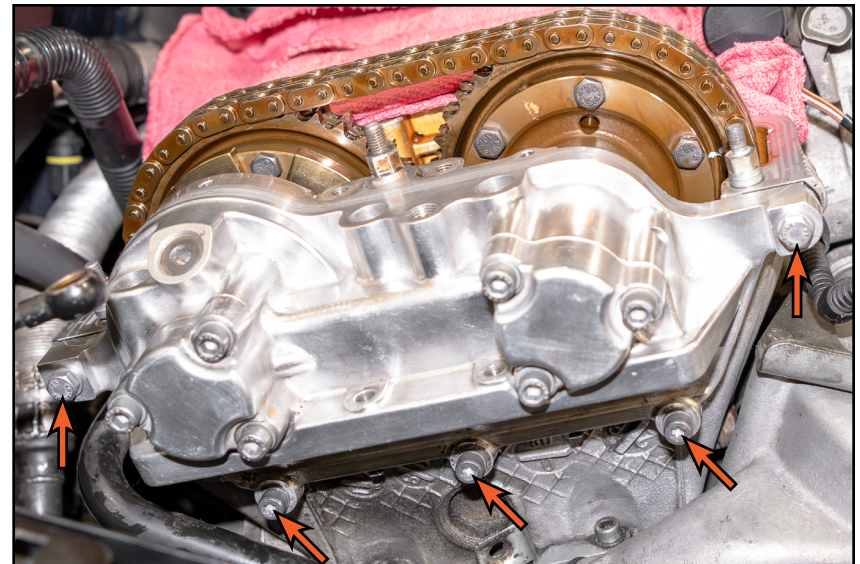
Step 23:

Push the vanos piston housing onto the dowels in the engine, ensuring the tabs (highlighted in **GREEN** in **Photo #1**) on the new hub engage the slots in the oil pump rotor (highlighted in **GREEN** in **Photo #2**), then remove the two support screws.



Step 24: 5mm Hex (Allen), 10mm Socket & Torque Wrench

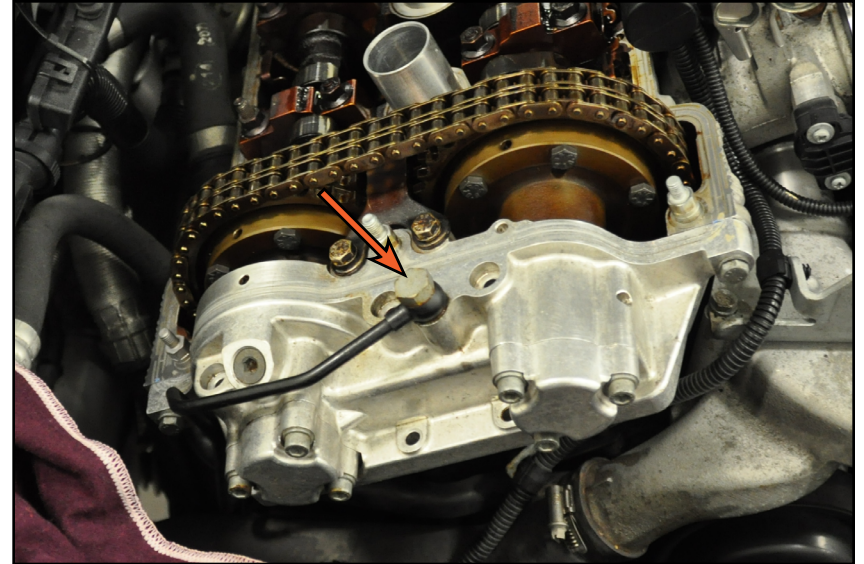
Replace the screws (arrows) to secure the vanos piston housing to the engine and torque them to 10 Nm (7 Ft-lbs).



VANOS HUB UPGRADE KIT INSTALLATION

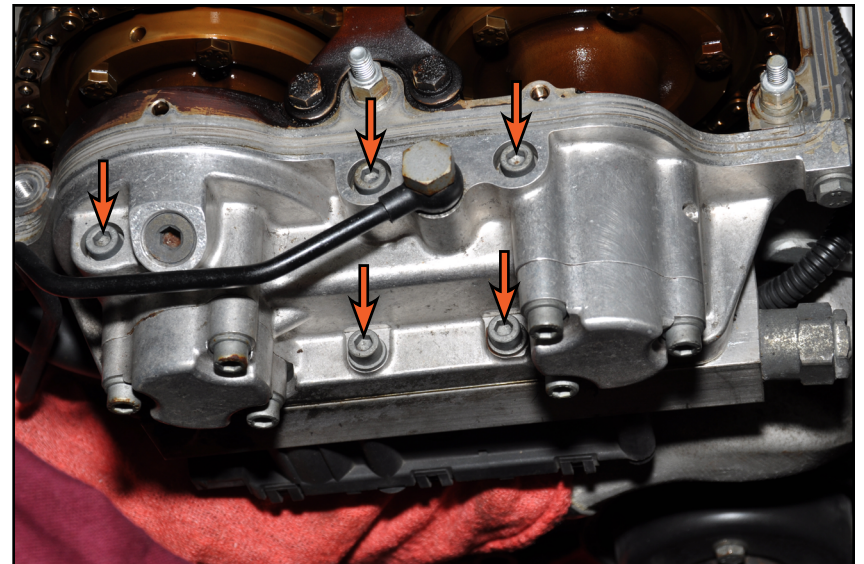
Step 25: 10mm, 14mm Socket & Torque Wrench

Reinstall the oil pipe and replace the mounting screw to secure it to the front of the engine. Replace the crush washers then tighten the banjo bolt (arrow) to 13 Nm (10 Ft-lbs).



Step 26: 5mm Hex (Allen) Socket & Torque Wrench

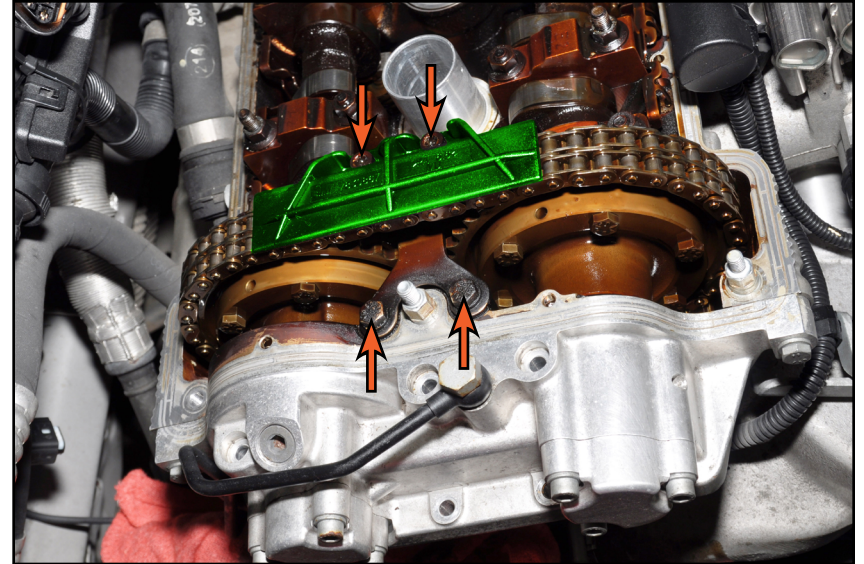
Reinstall the solenoid pack using a new sealing plate and torque the screws (arrows) to 10 Nm (7 Ft-lbs), then reconnect the connector.



VANOS HUB UPGRADE KIT INSTALLATION

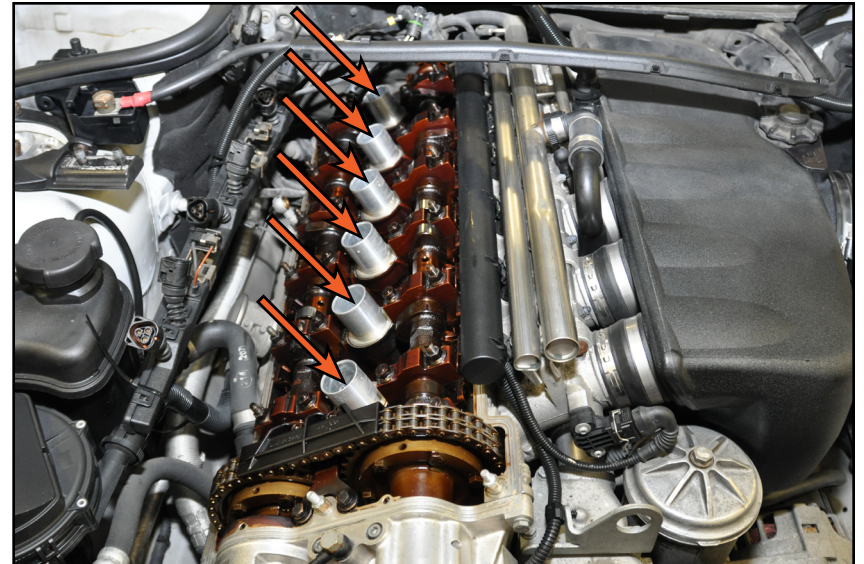
Step 27: 5mm Hex (Allen), 10mm Socket & Torque Wrench

Reinstall the cam chain guide (highlighted in **GREEN**), then reinstall the cam chain guide and vanos bracket screws (arrows) and torque them to 9 Nm (7 Ft-lbs).



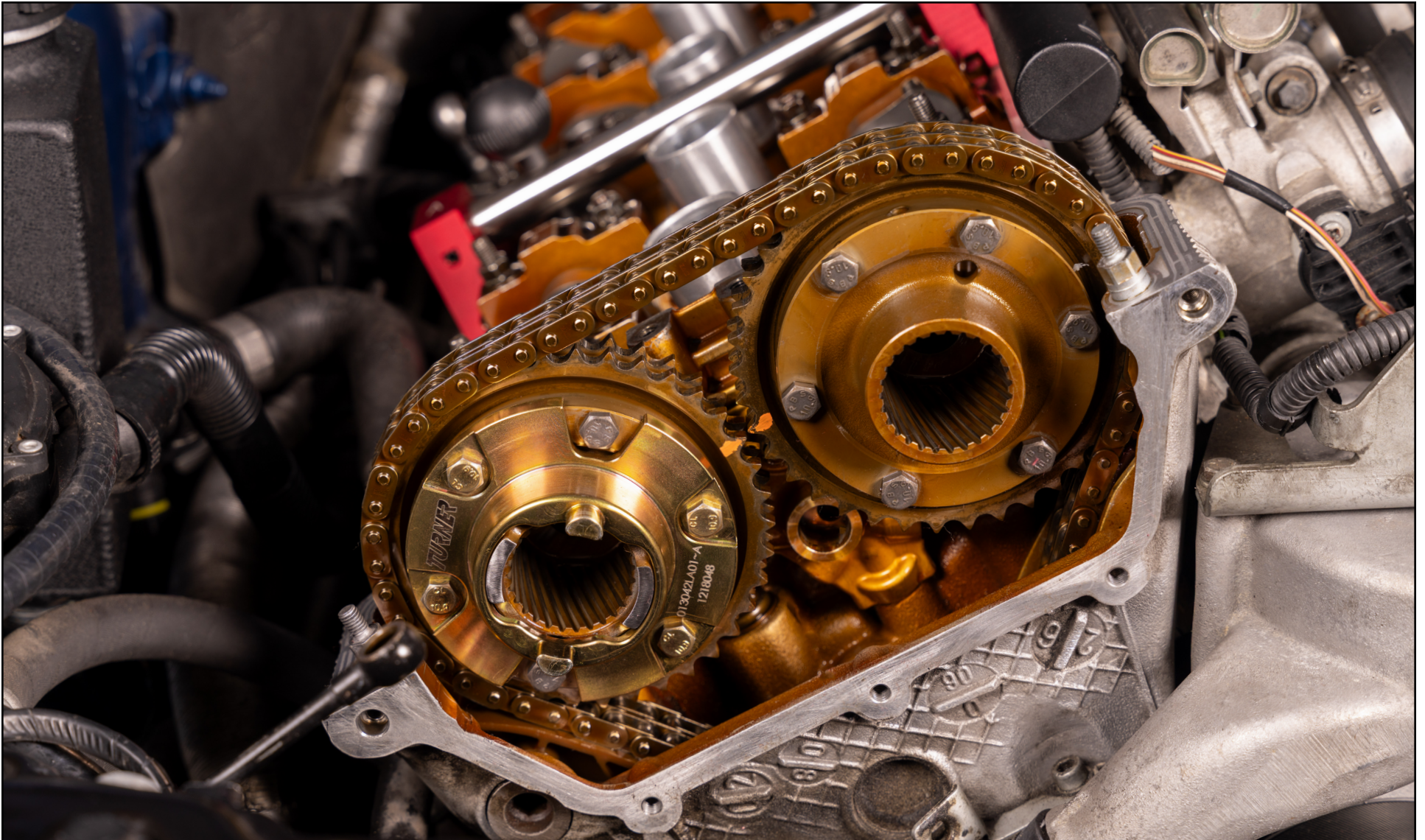
Step 28:

Reinstall the spark plugs (arrows) and torque them to 24 Nm (18 Ft-lbs). Reinstall the valve cover, ignition coils, engine cover, strut brace, cabin air filter housing, radiator fan & shroud, and airbox.



Congratulations, Your installation is complete!

Your S54 VANOS Hub Upgrade Kit 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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