

N63 Valve Stem Seal Tool Kit

Part #: AGA-N63-VSK-K



Problem:

Your BMW is smoking due to bad valve stem seals. Old valve stem seals harden over time and no longer provide a proper seal between the seal and the stem, allowing oil to leak into the combustion chamber and the exhaust. This leaking can cause your car to smoke and can decrease the life of your catalytic converter. Here at AGA, we've seen a number of cars that come in with CAT inefficiency codes that are solved by replacing the valve stem seals.

Solution:

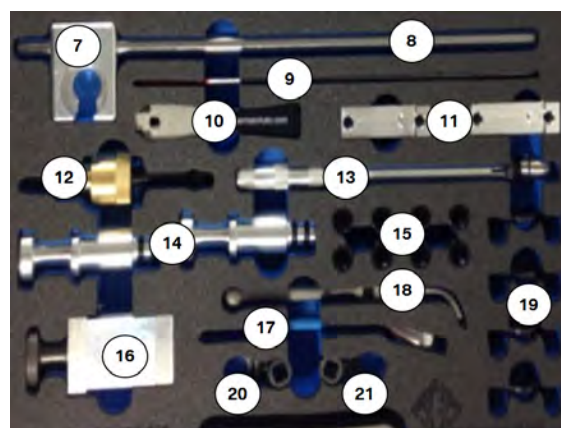
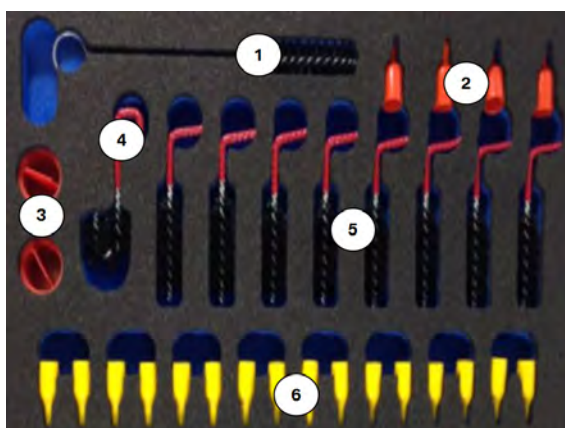
The AGA N63 Valve Stem Seal Tool Kit. Perform the Valve Stem Seal Repair without removing the engine or cylinder heads from the vehicle. This repair not only saves you a lot of hours and labor, but also eliminates the huge risk of returning customers with cylinder head gasket issues or oil leaks. This is one of the few tools a shop can buy and recover the cost on the 1st job performed.

Benefit:

Eliminates smoking from the exhaust, reduces risk of damaging catalytic converters, and helps the car pass smog. With our tool kit, you can do the repair in-house while saving the customer thousands. It's a win-win that keeps your customers in your shop and saves them the hassle of going to another facility to get the job done.

Parts Included with this Kit:

#	Part Number	Description	Quantity
1	AGA-HB-8-34	Brush	1
2	AGA-CP-014	Injection Rail Supply Cap	4
3	AGA-IBPP-N63	Injector Bore Plastic Plug	2
4	AGA-N63-UP-8-34	U-Bend Plug Brush	1
5	AGA-N63-PB-34	Plug Brush	8
6	AGA-CI-Y12	Injector and Injection Rail Cap	16
7	AGA-CB-N63	Compression Block	1
8	AGA-CLR-N63	Compression Lever Rod	1
9	AGA-TDC-1	TDC Indicator	1
10	AGA-VST-LH	Locator Handle	1
11	AGA-CB-N63	Cam Bracket	2
12	AGA-CS-N63	Compression Screw	1
13	AGA-N63-6MM-VKT	N63 Valve Keeper Tool	1
14	AGA-FISP-N63	Fuel Injector Sealing Plug	2
14A	AGA-FISP-O-N63	Fuel Injector Sealing Plug Replacement O-Rings	4
15	AGA-SPT12-125	Spark Plug TDC Tool	8
16	AGA-CH-N63	Chain Holder	1
17	AGA-RW-N63	Ratcheting Wrench	1
18	AGA-SRP-N63	Seal Pliers	1
19	AGA-CP-N63	Compression Plate	1
20	AGA-FL-N63	Compression Foot Left	1
21	AGA-FR-N63	Compression Foot Right	1



Note: For clarity purposes, the procedure described in this document was performed with the engine on an engine disassembly/assembly stand. Do not remove the engine when performing this procedure.

Before starting this repair, we highly recommend you watch the video on All German Auto's YouTube channel, "N63 Valve Stem Seal Tool Kit."

<https://www.youtube.com/watch?v=fg3kgBWaGkk>

Instructions:

These instructions are for experienced technicians only. An experienced technician should only do this job.

1. Before starting Valve Stem Seal Replacement, please complete the following steps.

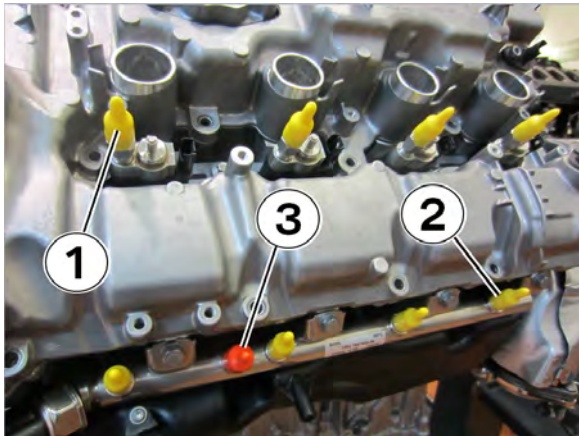
Tools Needed to Complete Preliminary Work:

- **AGA Direct Fuel Injection Kit (AGA-DFI-KIT)** or BMW Injector Remover and install tools.
- **AGA Cam Timing Kit (AGA-CTK-N63)** or BMW Timing kit and chain tensioner tool.



If you have access to the BMW TIS, or through All Data, Mitchell, etc., follow the step-by-step instructions. If you are using the AGA direct fuel injector tool kit and cam timing kit, please refer to the instructions provided with your kit.

- Remove the direct fuel injectors, right (Bank 1) and left (Bank 2). See AGA-DFI-Kit instructions.
- Remove the Valve Covers, right (Bank 1) and left (Bank 2).
- Remove the right (Bank 1) side Cams and rocker arms only. Leave the lifters in the head and DO NOT remove left side cams (Bank 2).
- See AGA's cam tool instructions for more details, or the process is also described in BMW TIS or Similar as 11 33 054 "Removing and installing/renewing rocker arms on R side (N63)"



2. Install a yellow cap onto each of the injectors (1) and the high-pressure fuel supply rail (2).

Install one orange cap onto the supply high-pressure pump supply port (3).

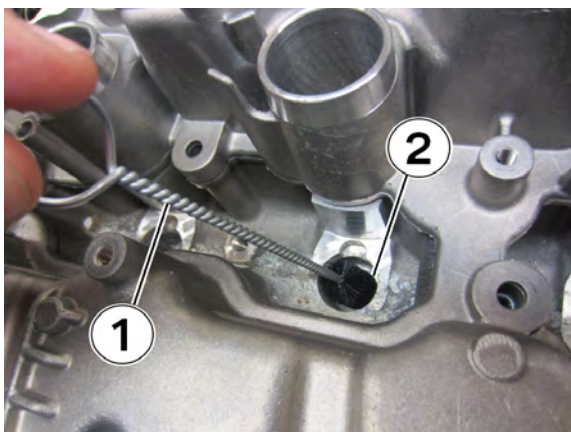
Part #: AGA-CI-Y12 (yellow)

Part #: AGA-CP-0-14 (orange)

Always store the high-pressure pumps in a clean location to avoid contamination.

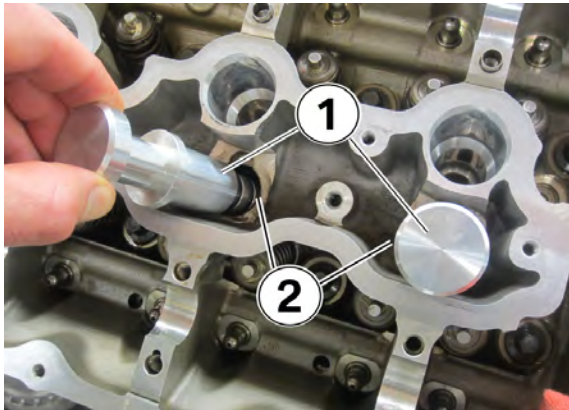


3. Wrap cylinder bank #1 timing chain with a small shop towel to protect it from contamination.



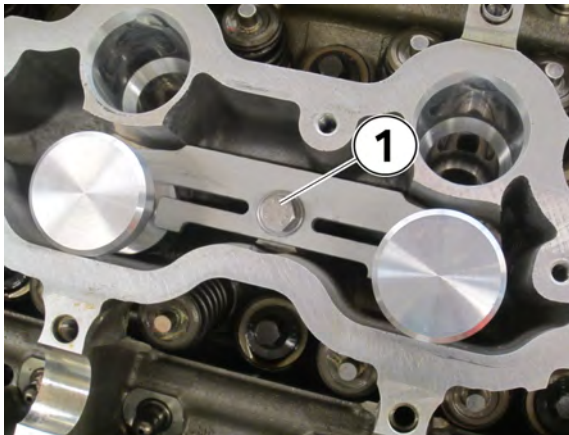
4. Gently clean the upper portion of the injector bores with the brush before installing the fuel injector-sealing plug.

Part #: AGA-HB-8-34

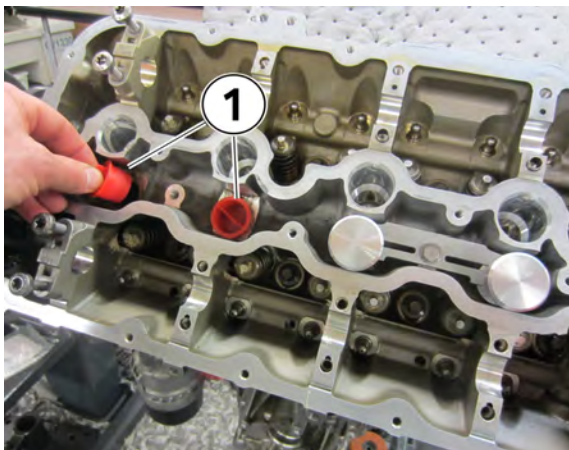


5. Install the fuel injector sealing plugs (1) into the cylinder 1 and 2 injector bores (2).

Part #: AGA-FISP-N63

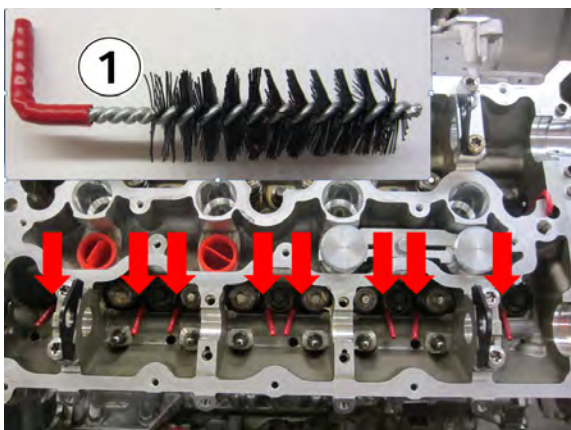


6. Reinstall the injector hold-down bracket and torque the M7 hex bolt to 13 Nm. (1)



7. Install the two red plugs into the remaining open injector bores (1), so that debris does not fall into the cylinders while performing the repairs.

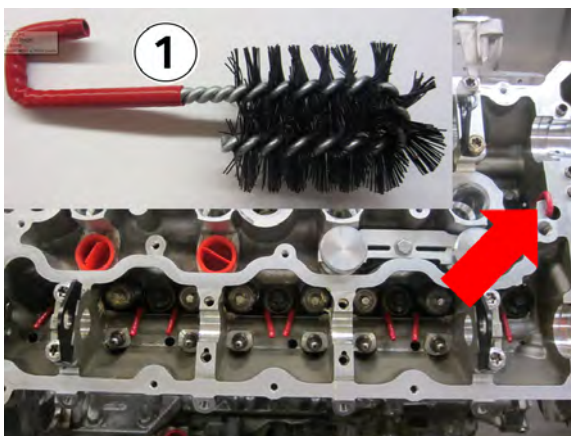
Part #: AGA-IBPP-N63



8. Install the eight supplied plug brushes (1) into the eight oil drain back holes (see arrows) in the cylinder head, located on either side of the head bolts.

If a collet is dropped, use a magnet to retrieve the collet from around the brush. Do not remove the brushes until all collets are accounted for.

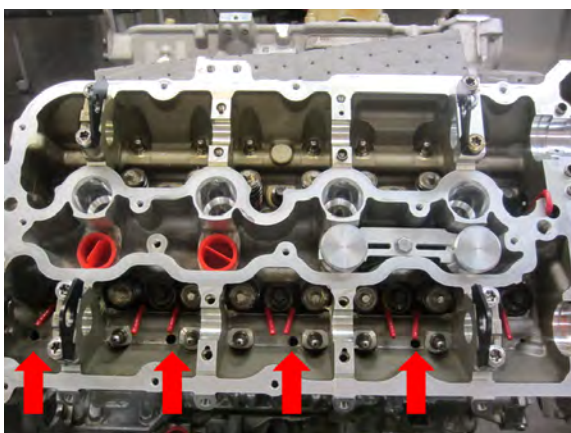
Part #: AGA-N63-PB-34



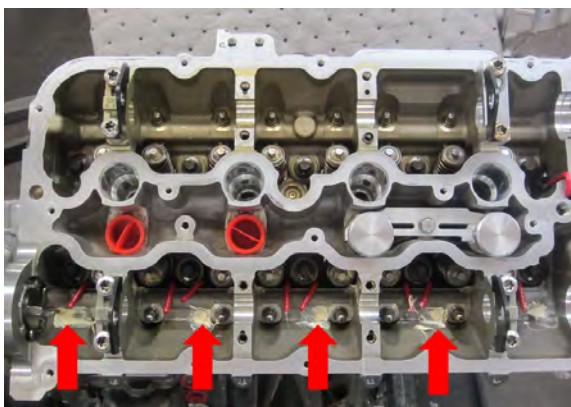
9. Install the U-bend plug brush (1) into the cylinder head drain back hole just below the exhaust camshaft (see arrow).

If a collet is dropped, use a magnet to retrieve the collet from around the brush. Do not remove the brushes until all collets are accounted for.

Part #: AGA-N63-UP8-34



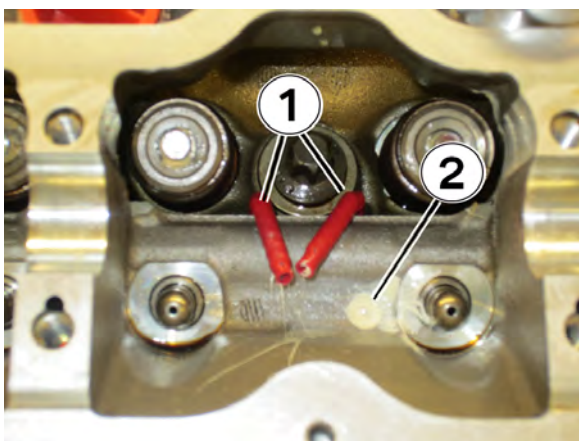
10. There are four drain back holes in the cylinder head near the hydraulic valve lash adjusters (HVA). See arrows.



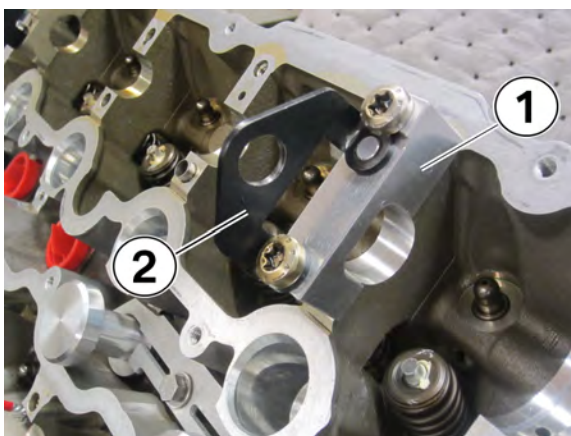
11. Block all four holes with a standard white lithium grease. See arrows.

Always use a standard white lithium grease that can be applied with a brush that has been stored properly in its container and not contaminated with foreign materials.

Using a white lithium grease in a spray can will not provide the same functions in this procedure.



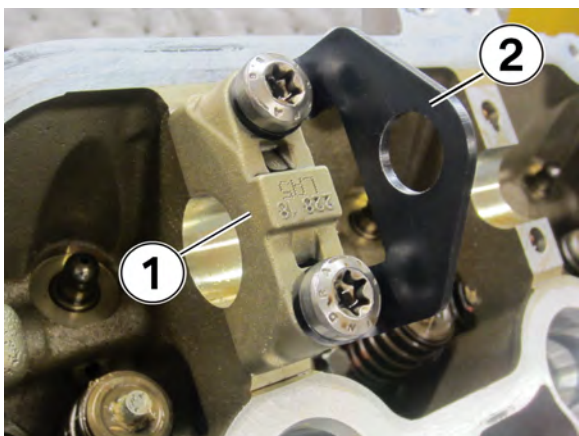
Overview of the plug brushes (1) and the white lithium grease (2)



12. Exhaust camshaft position: Using two of the four bolts that hold the high-pressure pump housing, install the cam bracket (1) and a compression plate (2) onto the front of the cylinder head, above the cylinder 1 ignition coil bore.

Use a T45 and hand-tighten the bolts.

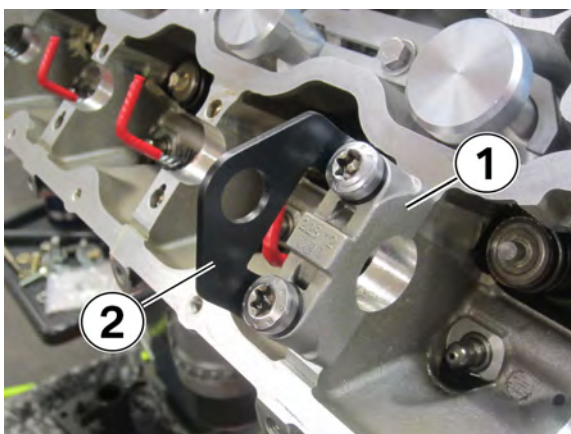
Part #: AGA-CB-N63 (Cam Bracket)
Part #: AGA-CP-N63 (Compression Plate)



13. Exhaust camshaft position: Reinstall the “LA5” exhaust camshaft bearing cap (1) with a compression plate (2) onto the rear of the cylinder head.

Use a T45 and hand-tighten the bolts.

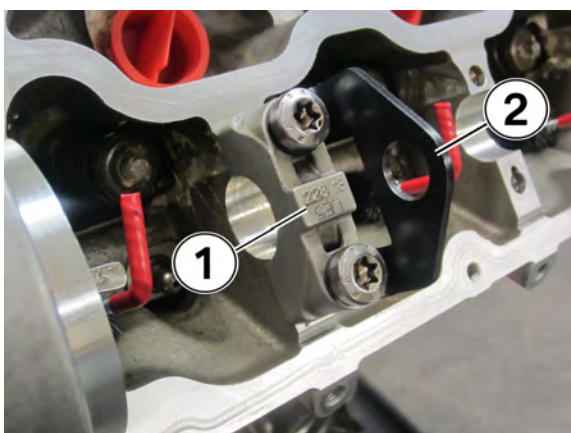
Part #: AGA-CP-N63 (Compression Plate)



14. Intake camshaft position: Reinstall the “LE2” intake camshaft bearing cap (1) with a compression plate (2) onto the front of the cylinder head.

Use a T45 and hand-tighten the bolts.

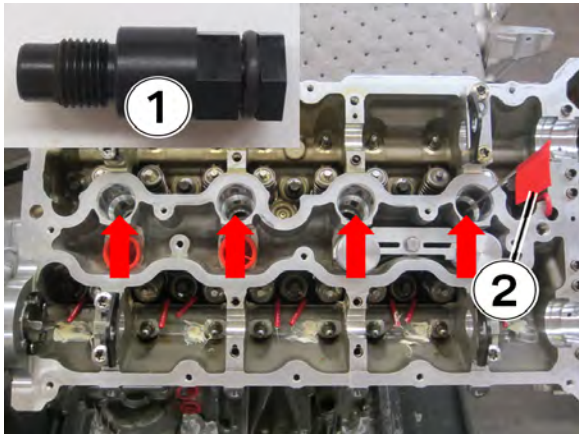
Part #: AGA-CP-N63 (Compression Plate)



15. Intake camshaft position: Reinstall the “LE5” intake camshaft bearing cap (1) with a compression plate (2) onto the rear of the cylinder head.

Use a T45 and hand-tighten the bolts.

Part #: AGA-CP-N63 (Compression Plate)

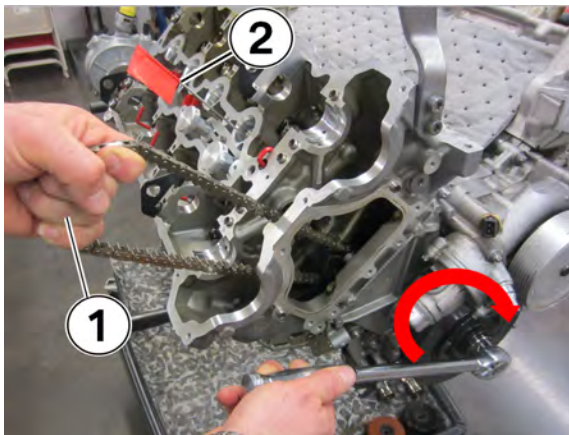


16. Screw four of the black plastic spark plug TDC tools (1) into each of the spark plug holes (see arrows) to avoid debris from falling into the cylinders.

Hand-tighten the tool (1) using tool number 12 1 220 and short 3/8 extension.

Insert the TDC flag into cylinder 1 (2).

Part #: AGA-SPT12-125



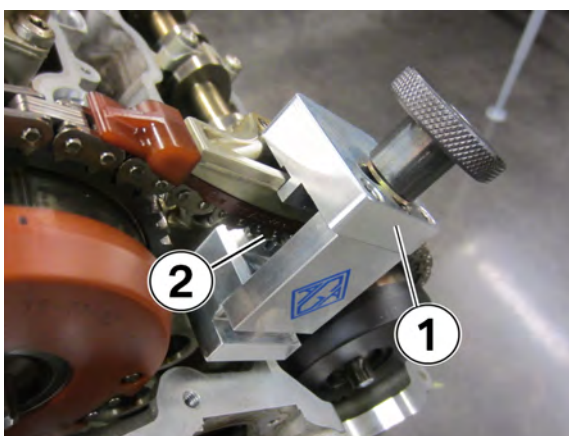
17. Hold the timing chain in one hand (1) and rotate the engine slowly in the clockwise direction (see arrow) while keeping the tension on the chain with one hand (1).

Do not allow the timing chain to fall down into the engine.

Stop turning the engine when TDC is reached.

It is good practice to turn the engine 1-2° past TDC (clockwise), so that the compressed air does not turn the engine backwards.

Do not apply compressed air to the cylinder yet.



18. Install the timing chain holder (1) onto the opposite cylinder bank timing chain guide rail.

Installing this tool will prevent the engine from rotating when the compressed air is applied to the cylinders using a leak-down tester.

Make sure the teeth on the tool match the chain teeth (2) before tightening.

Tighten gently with just one hand.

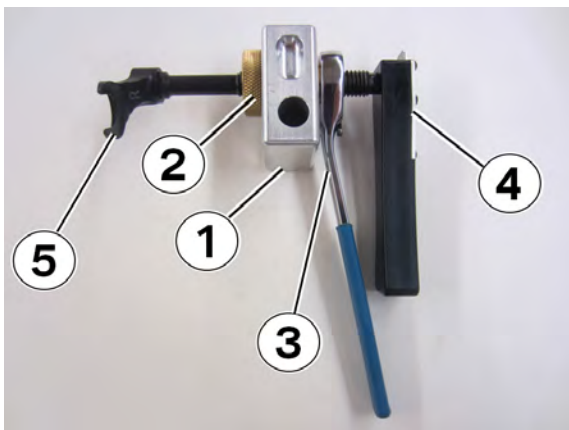
Part #: AGA-CH-N63



19. Use a cylinder leak-down tester to supply air pressure to the cylinder. The air pressure will hold the valve in the closed position while removing the valve spring retainer, valve spring, and keepers.

A leak-down tester already has a predetermined pressure, so that no damage occurs to the engine.

Never apply shop air directly to the cylinder.



20. Assemble the compression block (1) onto the compression nut and compression screw (2).

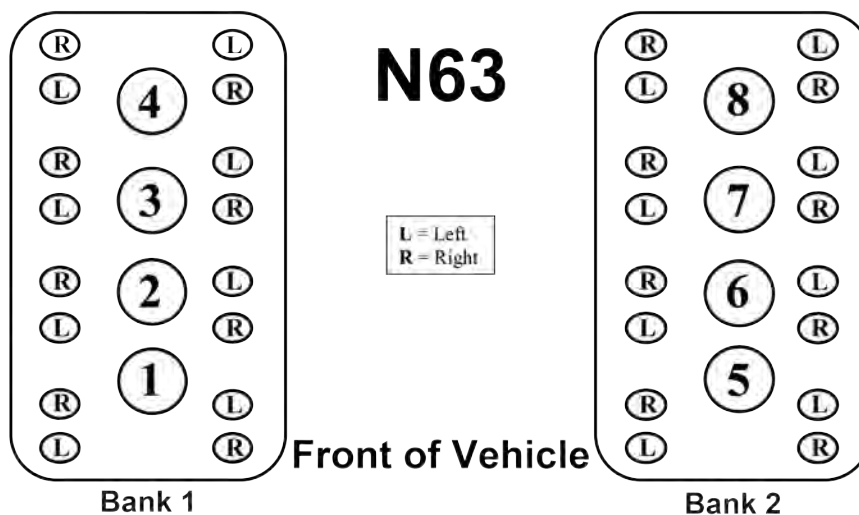
Install the ratcheting box wrench (3) and the locator handle (4).

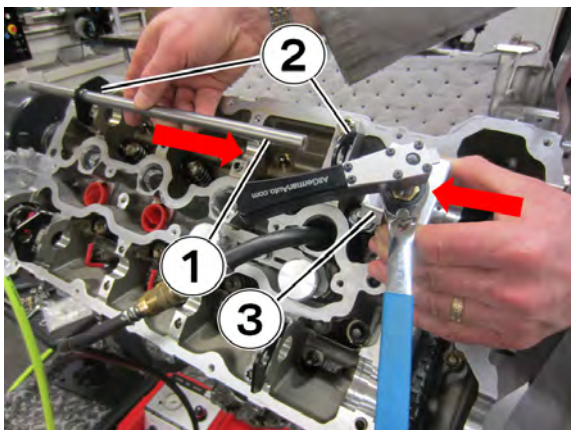
Use the laminated card in the kit to identify which compression foot (5) is required, based on the location of the valve spring in the cylinder head.

For example: The cylinder 1 exhaust front spring position requires the compression foot marked with an "R" = right (5).

Laminated Card Overview

[Firing Order: 1-5-4-8-6-3-7-2]

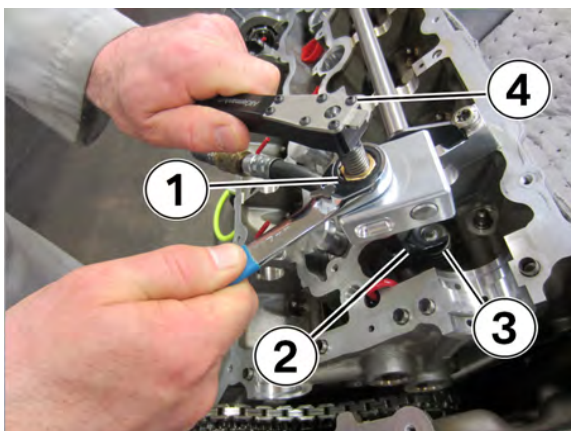




21. Slide the compression lever rod (1) into the compression plates (2) located on the camshaft bearing caps.

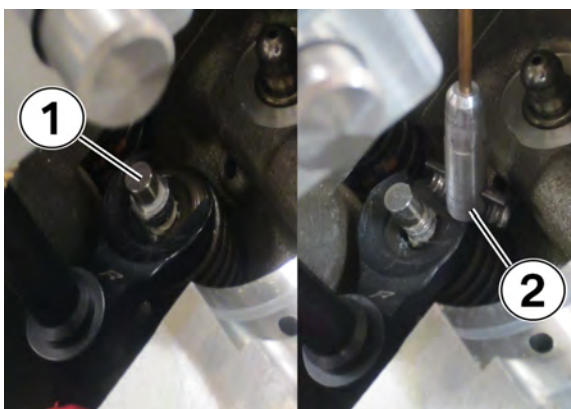
Slide the compression block (3) onto the compression lever rod (1) in the direction of the arrows.

Part #: AGA-CLR-N63

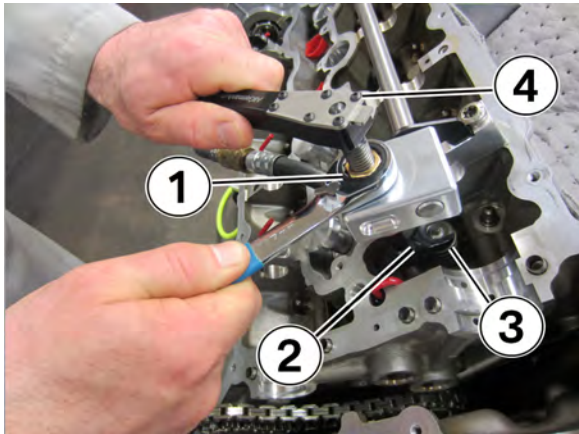


22. Rotate the compression nut (1) counter clockwise until the compression foot (2) contacts the valve spring retainer (3).

Hold the locator handle (4) firmly to keep the compression foot properly centered on the valve spring retainer (3).

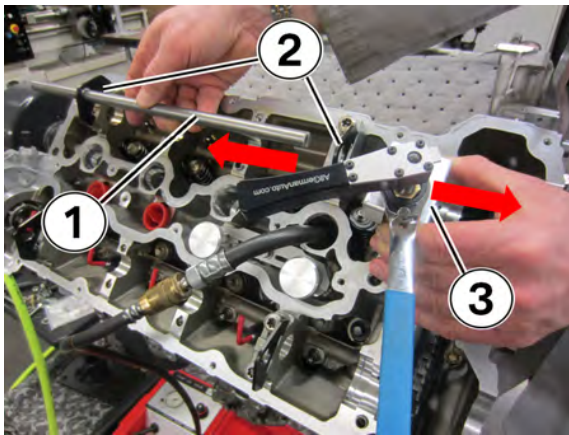


23. When the valve stem and keepers are exposed (1), the keepers can be removed with a magnet (2).



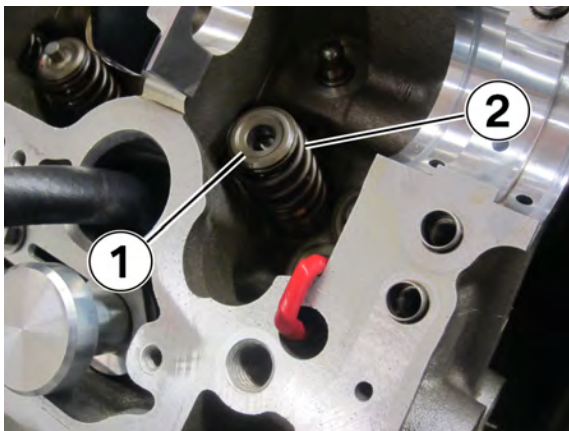
24. Rotate the compression nut (1) clockwise until the compression foot (2) releases the valve spring retainer (3).

Hold the locator handle (4) firmly to keep the compression foot properly centered on the valve spring retainer (3).

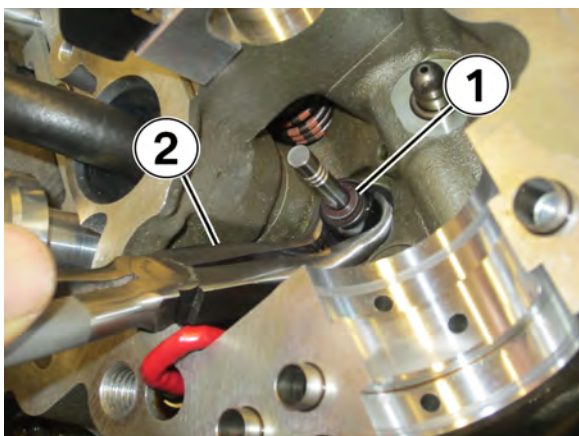


25. Remove the compression lever rod (1) from the compression plates (2), located on the camshaft bearing caps.

Remove the compression block (3) from the compression lever rod (1) in the direction of the arrows.

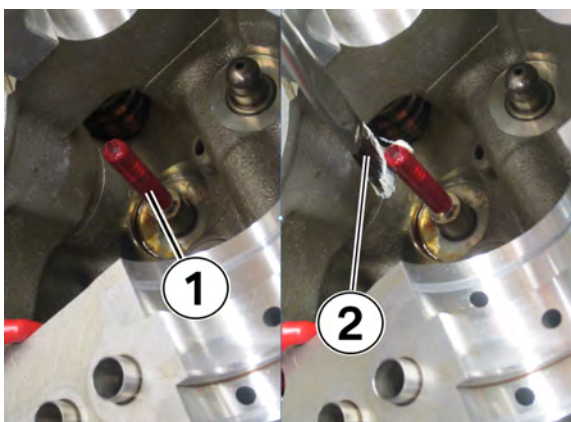


26. Remove the valve retainer (1) and valve spring (2) to expose the valve seal.

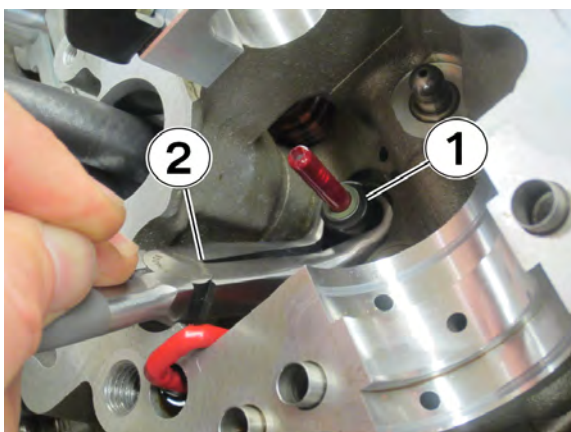


27. Remove the valve seal (1) with the seal pliers (2) included in the kit.

Part #: AGA-SRP-N63

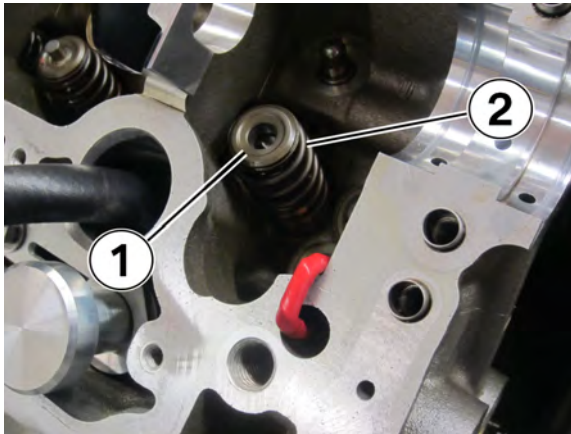


28. Install the valve stem protection sleeve (1) supplied with the valve seal kit. Apply a light coating of white lithium grease (2) to the sleeve exterior to help lubricate the valve seal installation.

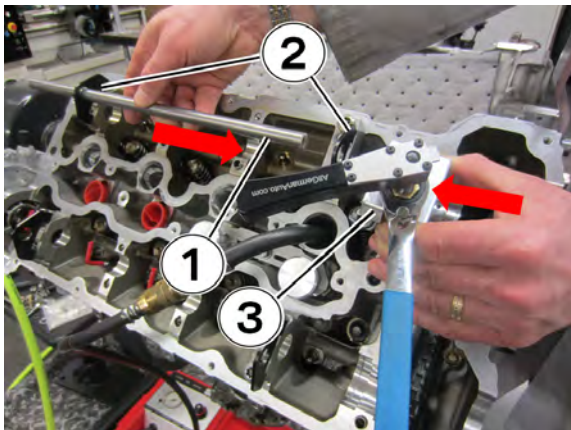


29. Install the new valve seal (1) with the seal pliers included in the kit (2).

Push firmly to seat the valve seal.

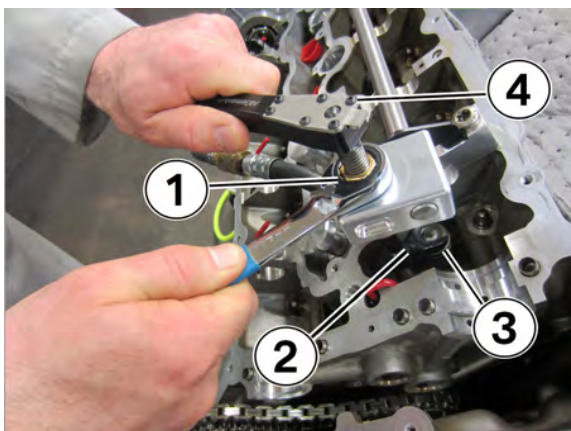


30. Install the valve spring retainer (1) and valve spring (2).



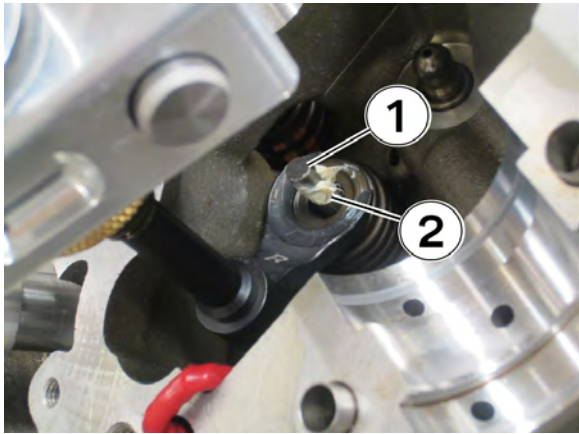
31. Slide the compression lever rod (1) into the compression plates (2) located on the camshaft bearing caps.

Slide the compression block (3) onto the compression lever rod (1) in the direction of the arrows.

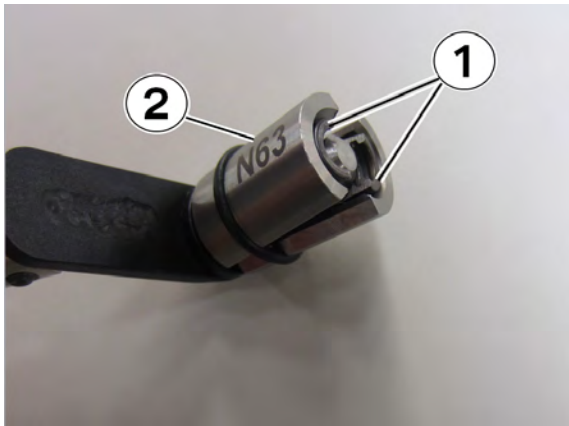


32. Rotate the compression nut (1) counter clockwise until the compression foot (2) depresses the valve spring (3).

Hold the locator handle (4) firmly to keep the compression foot properly centered on the valve spring retainer (3).



33. When the valve stem is exposed (1), apply a small amount of white lithium grease (2) with a brush to assist in holding the keepers in place.

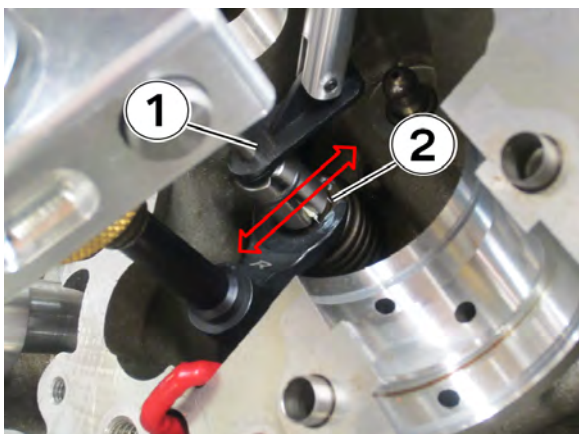


34. Install the keepers (1) into the N63 valve keeper tool (2) supplied in the kit.

Part #: AGA-N63-6mm-VKT



35. Apply a small amount of white lithium grease to the keeper grooves (1).



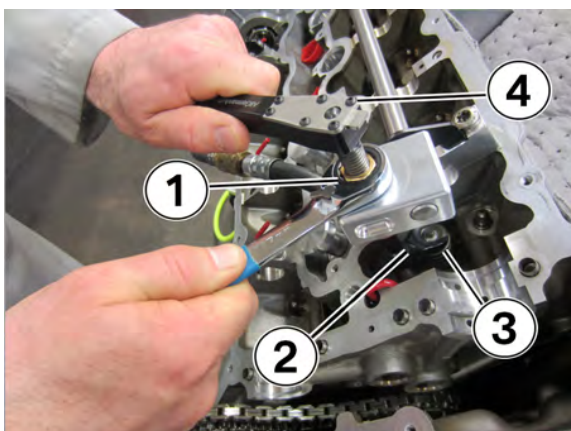
36. Place the N63 keeper tool with keepers (1) over the valve stem (2), and move the tool gently side to side to release the keepers (see arrow).

Gently lift the tool straight up, and the keepers will be left behind on the valve stem.



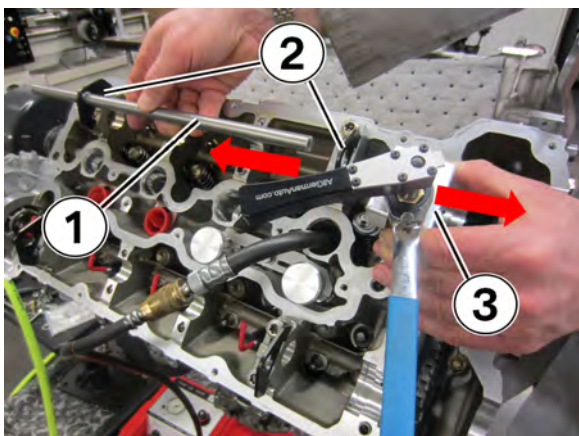
37. Inspect the position of the keepers on the valve stem to make sure they are in the proper position.

Do not wipe away any grease.



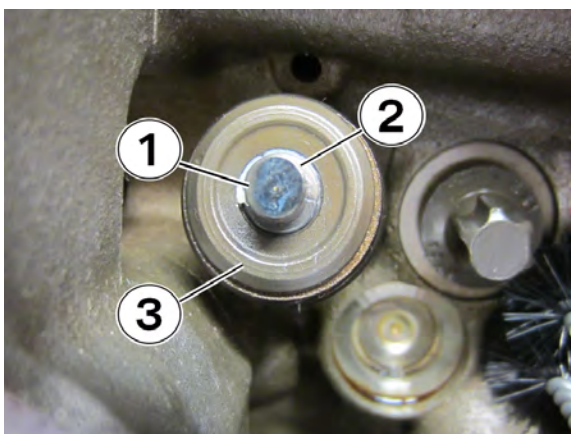
38. Rotate the compression nut (1) clockwise until the compression foot (2) releases the tension on the valve spring retainer (3).

Hold the locator handle (4) firmly to keep the compression foot properly centered on the valve spring retainer, so that the valve keepers seat correctly in the retainer (3).



39. Remove the compression lever rod (1) from the compression plates (2) located on the camshaft bearing caps.

Remove the compression block (3) from the compression lever rod (1) in the direction of the arrows.



40. Wipe away excess grease.

Inspect the valve stem (1), keepers (2), and the spring retainer (3) for the proper alignment before continuing.

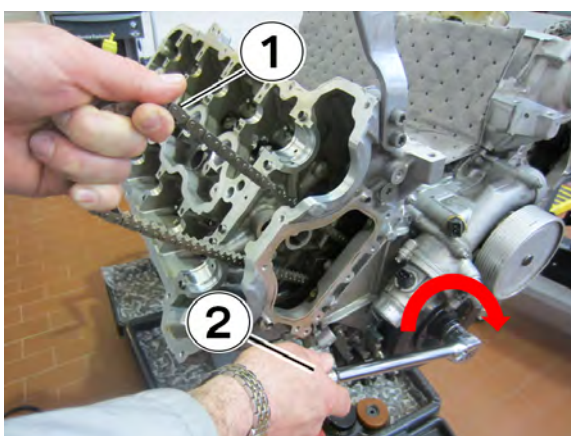
If the alignment is not correct, you will have to repeat steps 32-40.

41. Repeat steps 19 through 40 for the remaining valve seals on cylinder 1.

42. When cylinder 1 is complete, release the air supply from that cylinder and repeat steps 17 through 40 for cylinders 2, 3 and 4.

Fuel injector sealing plugs Part #: AGA-FISP-N63 needs to be moved to cylinders 3 and 4 when needed.

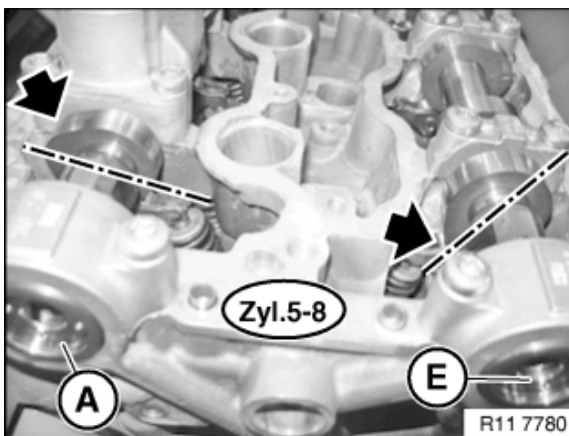
Injector bore plastic plugs Part #: AGA-IBPP-N63 needs to be moved to cylinders 1 and 2 when needed.



43. When cylinder bank 1 valve seal replacement is complete, the crankshaft has to be positioned 150° before cylinder 1 TDC. Hold the timing chain with one hand (1) and rotate the engine (2) in the direction of the arrow. Do not allow the timing chain to get jammed. Do not forget to remove the brushes from the oil return holes. Clear the oil return holes covered with grease, using a small brush or cotton swab.



44. When the crankshaft is positioned correctly, install AGA-11-8-570 Crank holder and AGA-11-9-190 Pin, or BMW equivalent tools.



45. With cylinder 1 at 150° before TDC:

Cylinder 5 exhaust camshaft (A) lobes will point to the left. See arrow and line. Cylinder 5 intake camshaft (E) lobes will point downward. See arrow and line.

Note: For purposes of clarity, the illustration shows the inlet and exhaust adjustment units removed.

Intake camshaft (A)

Exhaust camshaft (E)



46. Cam Timing is correct when timing chain is in correct tension with AGA chain tensioner tool (AGA 11-9-900), or BMW equivalent, and cam plates (AGA-11-9-893-IN-N63) & (AGA-11-9-893-EX-N63) rests without gap on the cylinder head.

47. Reinstall the camshafts on cylinder bank 1, and reinstall the VANOS gears before starting the procedure on cylinder bank 2.

Use AGA's Cam Timing Tool (AGA-CTK-N63) and instructions or BMW equivalent tools, to install and to set the cam timing on the R side (Bank 1), before removing cams on L side (Bank 2)

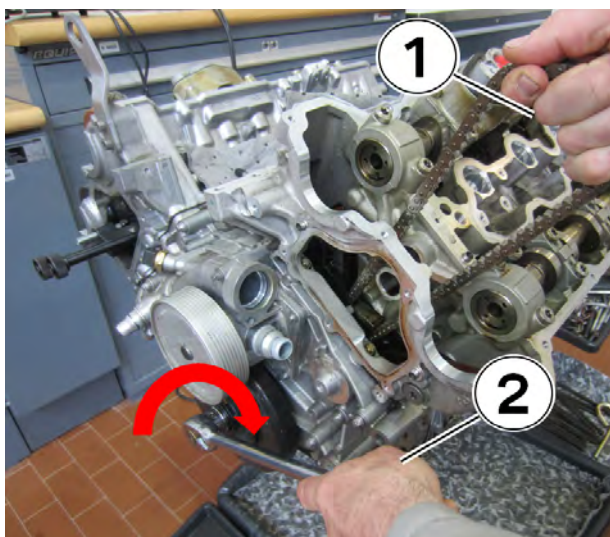
See AGA's cam tool instructions, or this process is described in BMW TIS or Similar as: 11 33 054 "Removing and installing/renewing rocker arms on R side (N63)." For further instructions, watch "AGA BMW N63 Cam Timing Tool"

48. After cylinder bank 1 is reassembled, remove the VANOS gears and camshafts on cylinder bank 2.

Repeat steps 1 through 37 on cylinder bank 2.

Note: Cylinder numbers start at the front of the cylinder head on cylinder bank 2.

Example: Cylinder 1 = Cylinder 5



49. When cylinder bank 2 valve seal replacement is complete, the crankshaft has to be positioned 150° before cylinder 1 TDC.

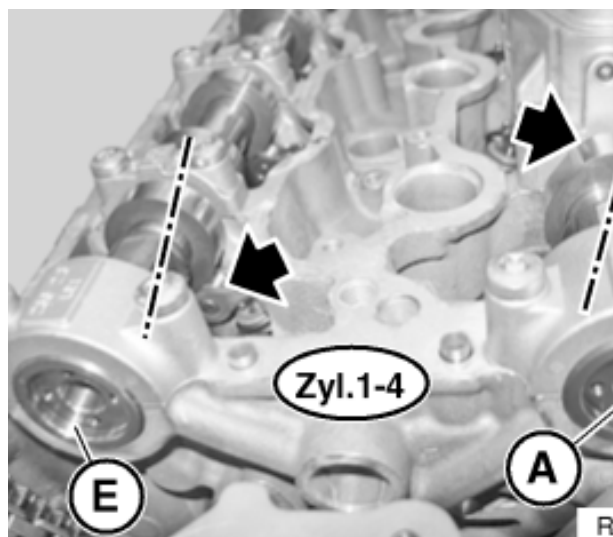
Rotate the engine in the direction of the arrow. Do not allow the chain to get jammed. Hold the timing chain with one hand (1).

Do not forget to remove the brushes from the oil return holes.

Clear the oil return holes covered with grease, using a small brush or cotton swab.



50. When the crankshaft is positioned correctly, install AGA-11-8-570 Crank holder and AGA-11-9-190 Pin, or BMW equivalent tools.



51. With cylinder 1 at 150° before TDC:

Cylinder 1 exhaust camshaft (A) lobes point at an angle upwards. See arrow and line.

Cylinder 1 intake camshaft (E) lobes point at an angle upwards. See arrow and line.

Note: For purposes of clarity, the illustration shows the inlet and exhaust adjustment units removed.

Intake camshaft (A)
Exhaust camshaft (E)

Use AGA's Cam Timing Tool (AGA-CTK-N63) and instructions or BMW equivalent tools, to install and to set the cam timing on the L side (Bank 2.)

See AGA's cam tool instructions, or this process is described in BMW TIS or Similar as: 11 33 052, "Removing and installing/renewing rocker arms on left side (N63)." For further instructions, watch "AGA BMW N63 Cam Timing Tool."

Reassemble the remaining portion of the vehicle per the repair instructions.