BGS technic

BGS 74684

Engine Timing Tool Set for VAG 1.0 / 1.2 / 1.4 / 1.5 TSI Petrol

TOOLS

1 Camshaft housing adapter plate, to be used as OEM VAS 611 007
2 Adapter plate spacer, to be used as OEM VAS 611 007
3 Spacer for intake camshaft (EA211 EVO), to be used as OEM VAS 611 007
4 Spacer for exhaust camshaft (EA211 EVO), to be used as OEM VAS 611 007
5 Intake camshaft adapter 1.5 TSI (EA211 EVO), to be used as OEM VAS 611 007
6 Exhaust camshaft adapter 1.5 TSI (EA211 EVO), to be used as OEM VAS 611 007
7 Inclinometer reference tool 1.5 TSI (EA211 EVO) to be used as OEM VAS 611 007
8 Securing bolts, to be used as OEM VAS 611 007
9 Inclinometer
10 Adjustment pin for rear exhaust camshaft wheel, to be used as OEM T10504/1
11 Crankshaft adjustment pin, to be used as OEM T10340
12 Lever stop pin (x2)
13 Belt tensioner adjustment tool, to be used as OEM T10499
14 Adapter plate spacer, to be used as OEM VAS 611 007
15 Intake camshaft adapter 1.0L / 1.2L / 1.4L TSI (EA211), OEM VAS 611 007
16 Exhaust camshaft adapter 1.0L / 1.2L / 1.4L TSI (EA211, OEM VAS 611 007
17 Inclinometer reference tool 1.0L / 1.2L / 1.4L TSI (EA211), OEM VAS 611 007

ATTENTION

Read the operating instructions and all safety instructions contained therein carefully before using the product. Use the product correctly, with care and only according to the intended purpose. Non-compliance of the safety instructions may lead to damage, personal injury and to termination of the warranty. Keep these instructions in a safe and dry location for future reference. Enclose the operating instructions when handing over the product to third-parties.

Instruction Manual

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INTENDED USE

This engine timing tool set is used for checking and adjusting the engine timing on the following vehicles.

VEHICLES

Brand	Model	Year of manufacture		
Audi	A1 Citycarver / Allstreet / Sportback	2018	-	2025
	A3 Saloon / Sportback	2020	-	2025
	Q2	2020	-	2025
Seat	Alhambra	2015	-	2025
	Arona	2017	-	2021
	Ateca	2016	-	2025
	Ibiza	2013	-	2021
	Leon/ST	2012	-	2025
	Mii	2012	-	2020
	Tarraco	2019	-	2025
	Toledo	2014	-	2022
Skoda	Fabia III / Estate	2014	-	2022
	Kamiq	2019	-	2025
	Karoq	2017	-	2025
	Kodiaq	2017	-	2025
	Octavia III	2013	-	2025
	Rapid / Spaceback	2015	-	2025
	Scala	2019	-	2025
	Superb III	2020	-	2025
	Yeti / Outdoor	2014	-	2017
Volkswagen	CC	2015	-	2017
	Golf / VII / VIII / SV / Sportsvan	2012	-	2025
	Load Up!	2014	-	2020
	Passat	2014	-	2025
	Polo	2014	-	2025
	Scirocco	2014	-	2018
	Sharan	2015	-	2025
	T-Cross	2018	-	2025
	Tiguan	2015	-	2025
	T-Roc / Cabriolet	2017	-	2025
	UP!	2011	-	2025

ENGINE CODES

1.0L	CHZA	CHZL	DKLD
	CHZB	CPGA	DKRA
	CHZC	DBYA	DKRB
	CHZD	DKJA	DKRC
	CHZF	DKLA	DKRF
	CHZJ	DKLB	
	CHZK	DKLC	

1.2L	CJZA
	CJZB
	CJZC
	CJZD
	CYVA
	CYVB
	CYVD

1.4L	CHPA	CXSA
	CMBA	CZCA
	CPVA	CZDA
	CPVB	CZDD
	CPWA	DGEA
	CUKB	DGEB
	CUKC	DJKA

1.5L	DACA
	DACB
	DADA
	DFYA
	DPBA
	DPBE

More information regarding this item and a list of suitable engines and models can be found on our website: www.bgstechnic.com

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SAFETY NOTES

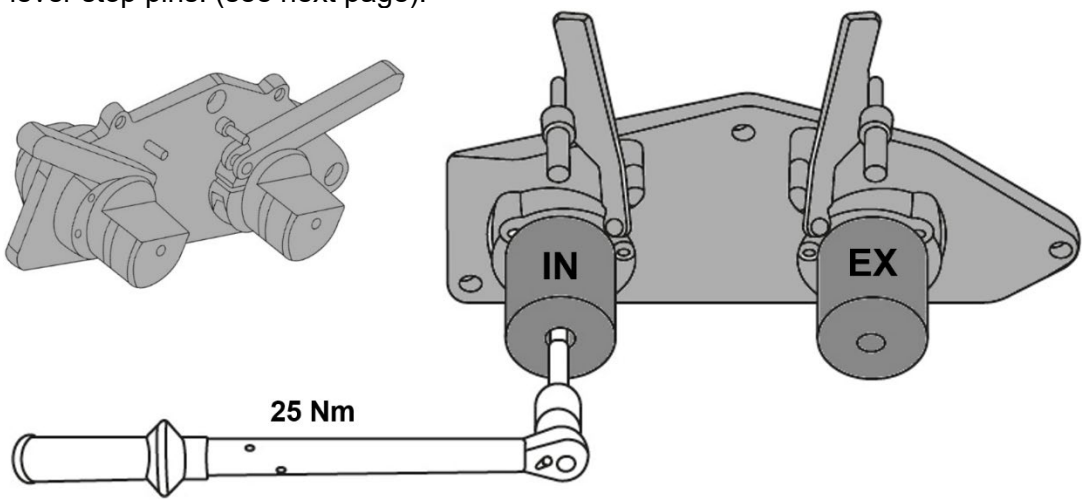
- Keep children and other unauthorised persons away from the work area.
- Do not let any children play with the tool or its packaging.
- Do not use the tool if parts are missing or damaged.
- Use the tool for the intended purpose only.
- Never place the contained tools on the vehicle battery. Danger of short circuit.
- Caution when working on the running engines. Loose clothing, tools and other objects may be caught by rotating parts and cause severe injuries.
- Be careful when working on hot engines because of the risk of burn injuries!
- Remove the ignition key before carrying out repairs to prevent accidental starting of the engine, resulting in engine damage and injury.
- **These instructions serve as brief information and never replace the workshop manual. Please always obtain technical specifications such as torque values and instructions on disassembly and assembly from the vehicle-specific service literature.**
- After repair or before starting the engine, turn a minimum of 2 turns by hand and check the timing again.
- Turn the engine only in the normal direction of rotation (clockwise), unless otherwise.
- Never use adjustment tools for camshafts and crankshafts as counter-holders when loosening or tightening bolts on pulleys, camshaft or crankshaft wheels. Tools and engine components can be damaged as a result. Only use tools that are suitable for this purpose.

ENVIRONMENTAL PROTECTION

Recycle undesired materials instead of disposing of them as waste. Packaging should be sorted, taken to a recycling centre and disposed of in an environmentally friendly manner. Check with your local waste disposal authority about recycling measures.

USE WITH 1.0 / 1.2 / 1.4L TSI ENGINES

Digital camshaft angle adjustment set / preparation and clamp adjustment. The clamping effect of the adapter lock may need to be adjusted before each use. The following procedure should be used to adjust the clamping force. Assemble the camshaft locking tools with the components on a workbench, including installing the camshaft adapters into the assemblies. Lock the adapter locking levers and insert the lever stop pins. (see next page).



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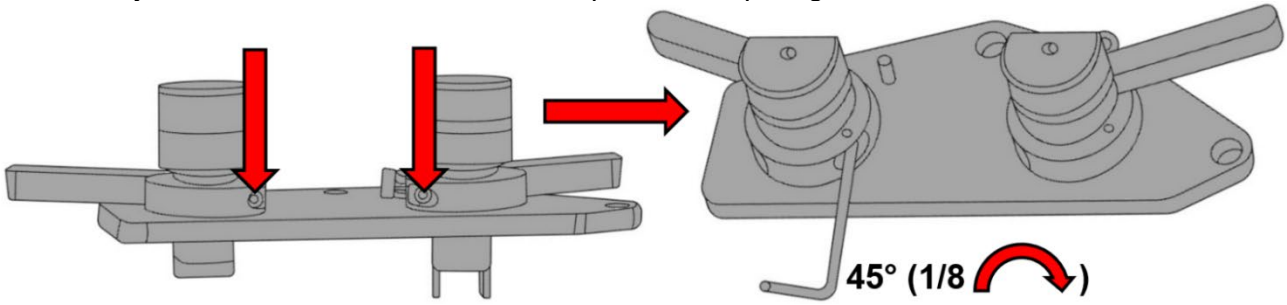
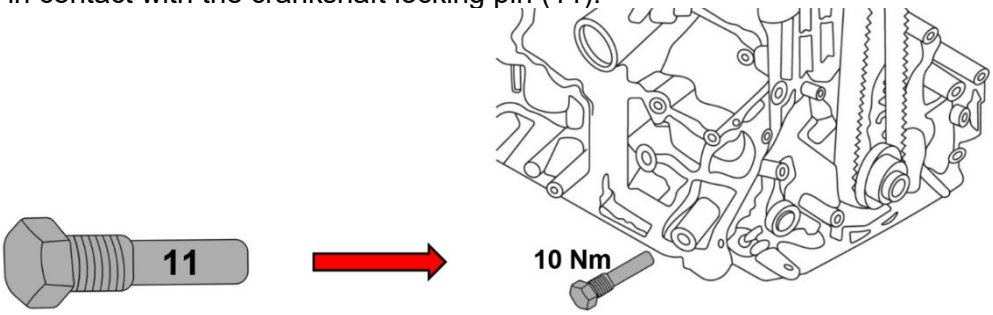
ADJUSTING THE CLAMPING FORCE

Use a 6 mm Allen key and a torque spanner to check that the adapters do not rotate at a torque of 25 Nm. If the adapters rotate at less than 25 Nm, tighten the clamping adjustment screw. Unlock the levers and turn the assembly over to access the adjustment screws. NOTE: Ensure that the camshaft adapters are fully inserted into the clamps. Adjust the clamping force with a 3 mm hex key. Tighten the screw by 1/8 of a turn and then check the specified torque again.

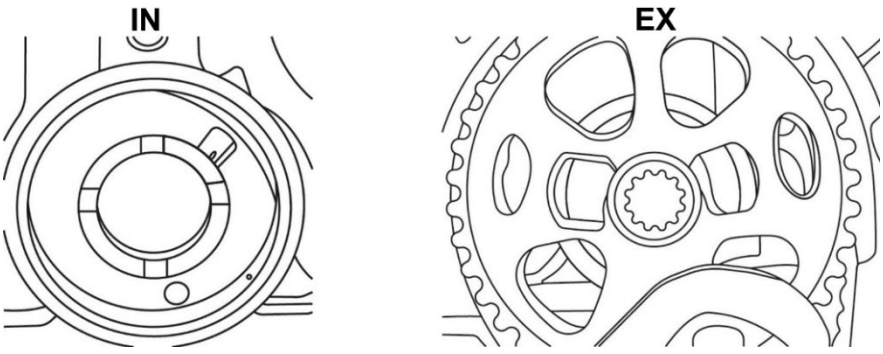


INITIAL ENGINE ADJUSTMENT (old belt)

Locate and remove the crankshaft locking pin plug at the rear of the engine block. Screw the crankshaft locking pin (11) into the threaded hole and tighten to 10 Nm. If the crankshaft locking pin cannot be screwed in completely, remove it and turn the crankshaft a quarter turn clockwise. Reinsert the crankshaft locking pin and tighten to 10 Nm. Now turn the crankshaft clockwise until the crankshaft is in contact with the crankshaft locking pin (11).



Starting from the gearbox end of the engine, check whether the camshafts are aligned as shown in the illustration. If the camshafts are misaligned by 180 degrees, remove the crankshaft locking pin (11) and rotate the crankshaft 360 degrees. Replace the crankshaft locking pin (11) and ensure that the camshafts are aligned as shown in the illustration. NOTE: DO NOT remove the water pump drive pulley.



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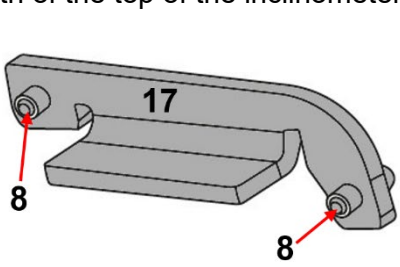
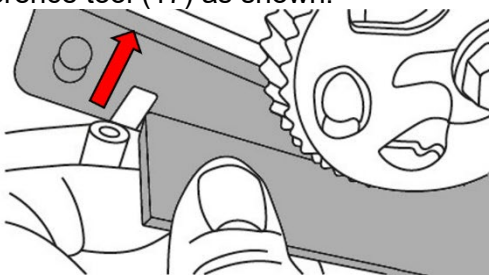
ASSEMBLING THE INCLINOMETER REFERENCE TOOL

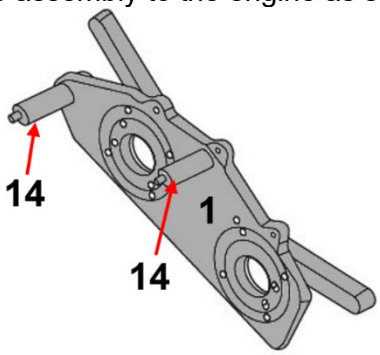
Assemble the inclinometer reference tool (17) using the securing bolts (8) as shown. IMPORTANT: Ensure this area is clear so that the tool sits flush and contacts the bottom of the cylinder head along the entire length of the top of the inclinometer reference tool (17) as shown.

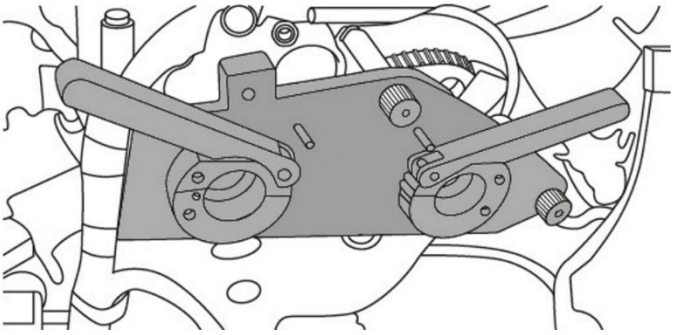




ASSEMBLING THE CAMSHAFT LOCKING TOOLS

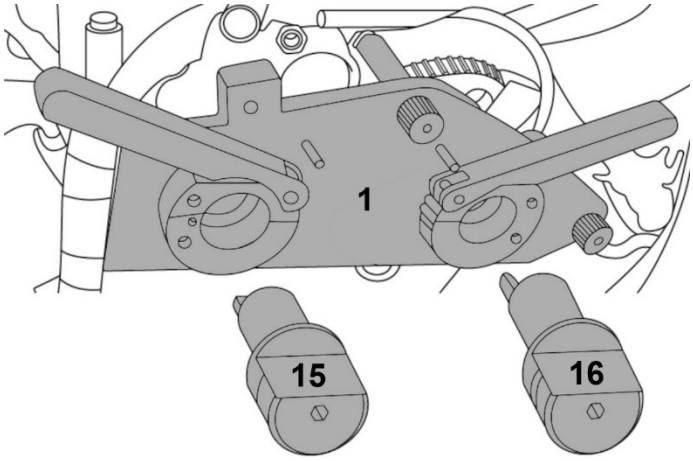
Assemble component (1) and component (14) as shown in illustration 4.
Attach the assembly to the engine as shown in the illustration.





ASSEMBLING THE CAMSHAFT ADAPTER

Insert the 2 camshaft adapters (15) & (16), see illustration.
NOTE: It is important that the camshaft adapters (15) & (16) are fitted to the correct camshaft according to the markings. Camshaft adapter (15) must be fitted to the intake camshaft and camshaft adapter (16) to the exhaust camshaft.
The ends of the camshaft adapters (15) & (16) must correctly engage with the camshafts.
Tighten the clamping screws on the camshaft adapters (15) & (16) with a 6 mm hex key. Maximum torque 15 Nm.



CHECKING THE TIMING

Follow the instructions in the Chapter "**FOR 1.5L TSI ENGINES / CHECKING TIMING**" for checking the timing, fitting the belt, adjustment procedure and calculating the correction angle.

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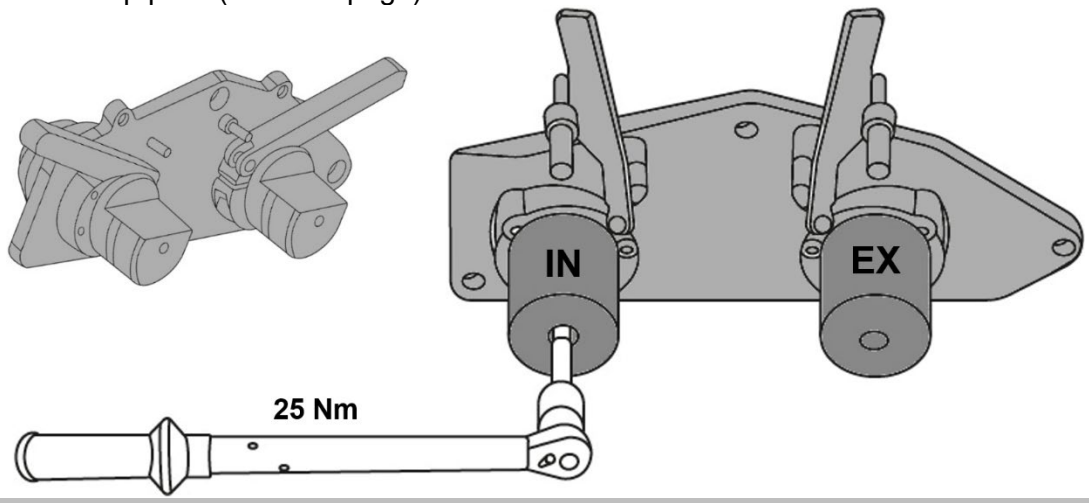
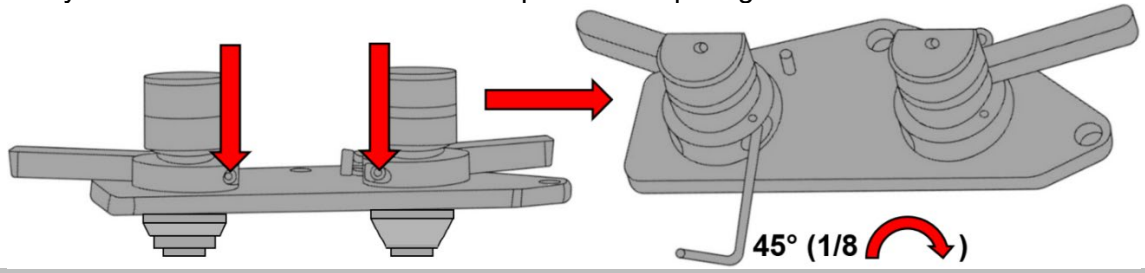
USE WITH 1.5L TSI ENGINES

Digital camshaft angle adjustment set / preparation and clamp adjustment. The clamping effect of the adapter lock may need to be adjusted before each use. The following procedure should be used to adjust the clamping force. Assemble the camshaft locking tools with the components on a workbench, including installing the camshaft adapters into the assemblies. Lock the adapter locking levers and insert the lever stop pins. (see next page).



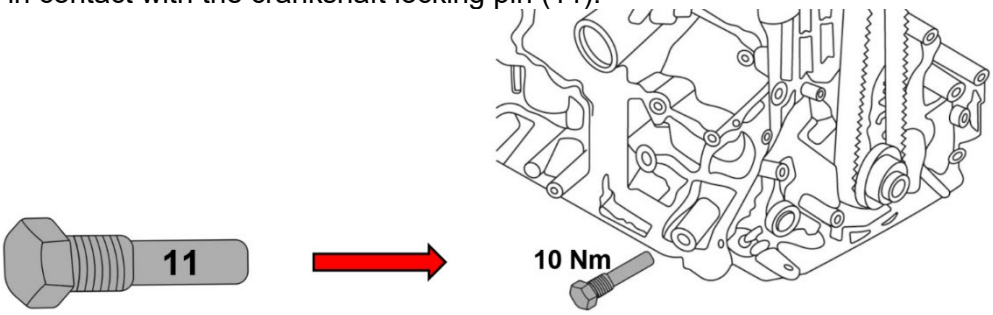
ADJUSTING THE CLAMPING FORCE

Use a 6 mm Allen key and a torque spanner to check that the adapters do not rotate at a torque of 25 Nm. If the adapters rotate at less than 25 Nm, tighten the clamping adjustment screw. Unlock the levers and turn the assembly over to access the adjustment screws. NOTE: Ensure that the camshaft adapters are fully inserted into the clamps. Adjust the clamping force with a 3 mm hex key. Tighten the screw by 1/8 of a turn and then check the specified torque again.



INITIAL ENGINE ADJUSTMENT (old belt)

Locate and remove the crankshaft locking pin plug at the rear of the engine block. Screw the crankshaft locking pin (11) into the threaded hole and tighten to 10 Nm. If the crankshaft locking pin cannot be screwed in completely, remove it and turn the crankshaft a quarter turn clockwise. Reinsert the crankshaft locking pin and tighten to 10 Nm. Now turn the crankshaft clockwise until the crankshaft is in contact with the crankshaft locking pin (11).



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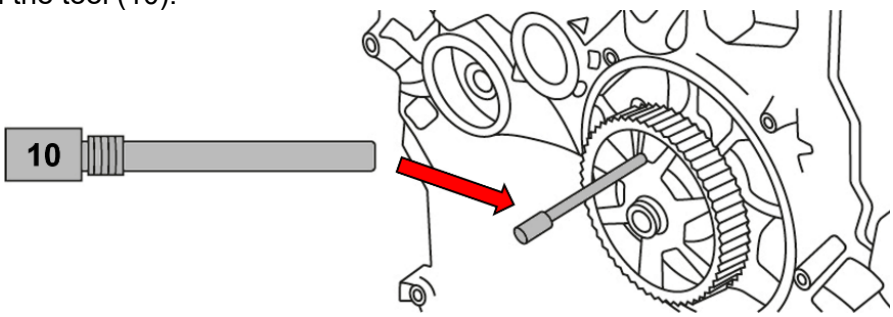
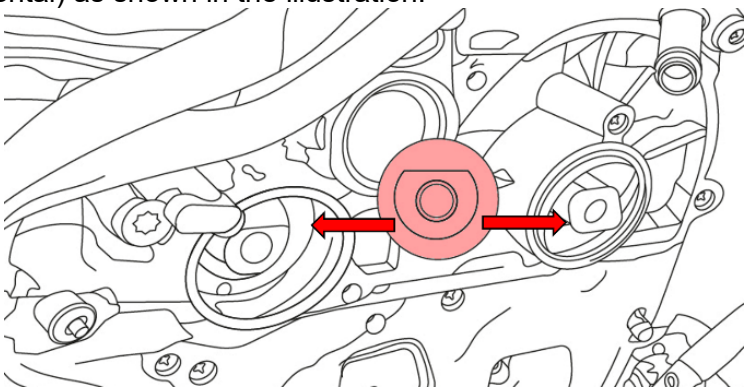
ADJUSTING PIN FOR REAR EXHAUST CAMSHAFT WHEEL

Insert the adjusting pin (10) for the rear exhaust camshaft wheel (gearbox side) as shown. If the bore is offset by 180 degrees, remove tool (11) and rotate the crankshaft 360 degrees. Reinsert the tool (11) and position the tool (10).

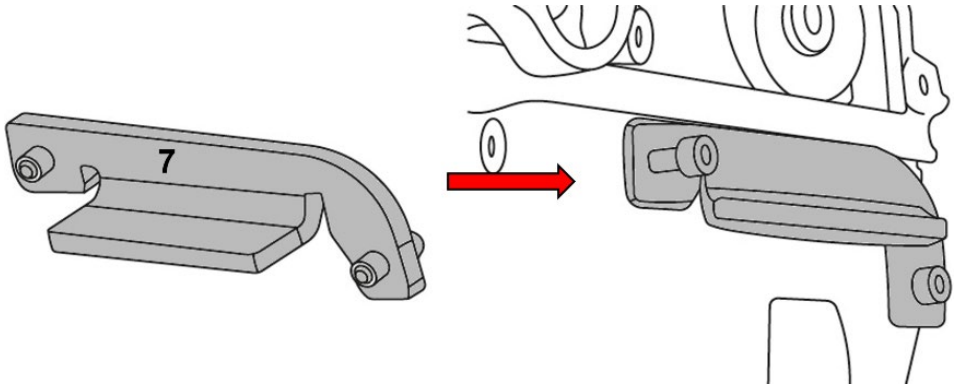


After the initial mechanical alignment has been set, remove tool (10) and use a suitable pulley holding tool to remove the water pump and camshaft pulley. Check that both camshaft surfaces are in the 12 o'clock position (horizontal) as shown in the illustration.



ASSEMBLING THE CAMSHAFT ADJUSTMENT TOOL

To check the position of the camshafts accurately, the inclinometer reference tools (7) and (8) must be fitted to the gearbox end of the camshafts as follows:
Firstly assemble the inclinometer reference tool (7) with the fixing screws (8) as shown in the illustration. IMPORTANT: Ensure that this area is clear so that the reference tool (7) sits flush and contacts the bottom of the cylinder head along the entire length of the top of the reference tool as shown.



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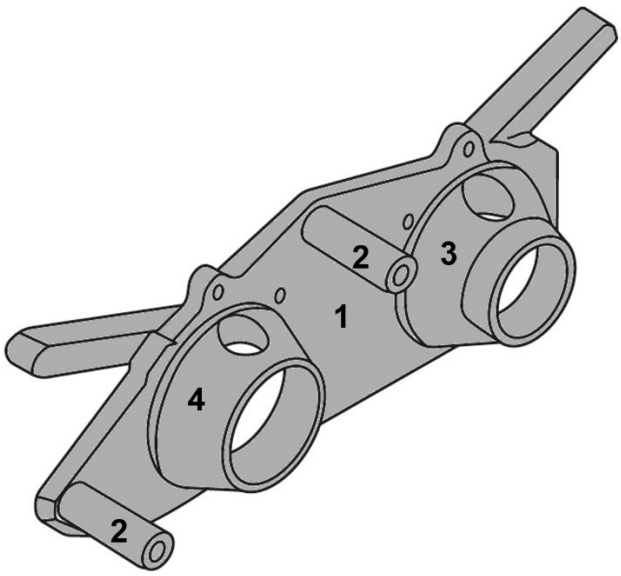
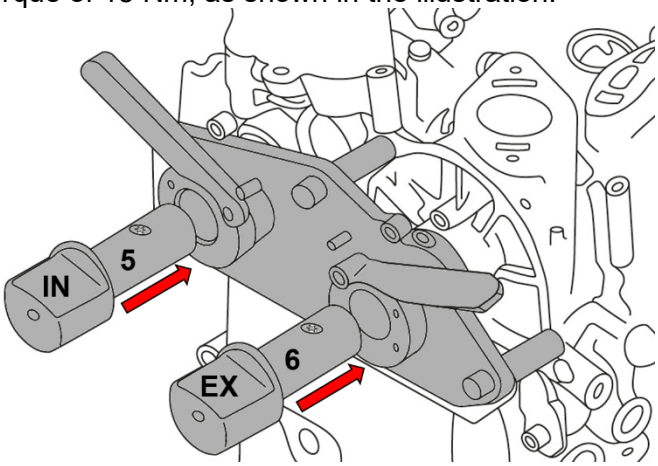
CAMSHAFT LOCKING TOOL

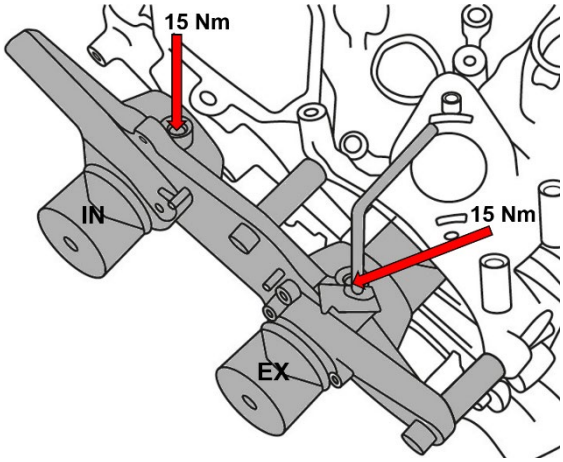
Assemble components (1), (2), (3), and (4). Then, mount the assembly to the engine using the tool components in (3) and (4) as shown in the illustration.



CAMSHAFT ADAPTER

Insert the 2 camshaft adapters (5) and (6).
NOTE: It is important that tool components (5) and (6) are attached to the correct camshaft according to the markings.
Tool component (5) must be attached to the intake camshaft and tool component (6) to the exhaust camshaft.
The ends of the tool components (5) and (6) must correctly engage with the camshafts.
Tighten the clamping screws on tool components (5) and (6) with a 6 mm hex key to a maximum torque of 15 Nm, as shown in the illustration.





NOTE: Ensure that adapters (5) and (6) are securely seated on the camshafts and cannot rotate.

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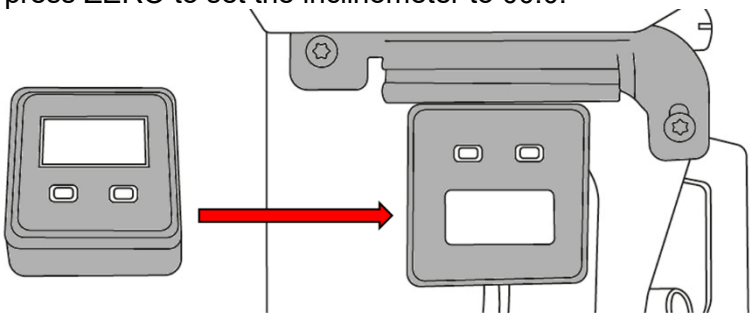
CHECK TIMING

Position the inclinometer (9) on a flat surface and switch it on. Wait until the displayed value stabilises. Now position the inclinometer (9) with the top facing down against the inclinometer reference tool (7) and wait until the value stabilises. Hold the inclinometer against the inclinometer reference tool (7) and press ZERO to set the inclinometer to 00.0.

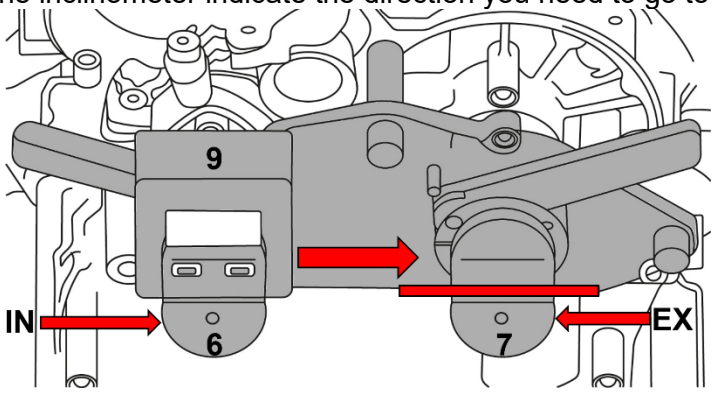


Move the inclinometer to the flat side of the inlet adapter (the correct side facing up) and note the displayed value. Repeat this for the outlet adapter and record the measurements. NOTE: Always note the direction of the measurement.

Up arrow (▲) = negative angle

Down arrow (▼) = positive angle

NOTE: The arrows on the inclinometer indicate the direction you need to go to find the zero point.



Compare the recorded measured value with the vehicle manufacturer's engine-specific data.
Example: Engine code DADA (1.5 litre)

Specified inlet angle -0.3° +/- 1.2° = range from -1.5° (▲) to +0.9° (▼)

Specified outlet angle +1.1° +/- 1.2° = range from -0.1° (▲) to +2.3° (▼)

WARNING: The values stated above are for demonstration purposes only. Please refer to the specific engine tolerances provided by the vehicle manufacturer.

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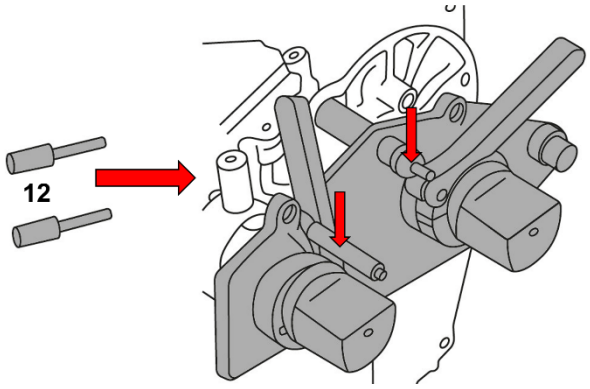
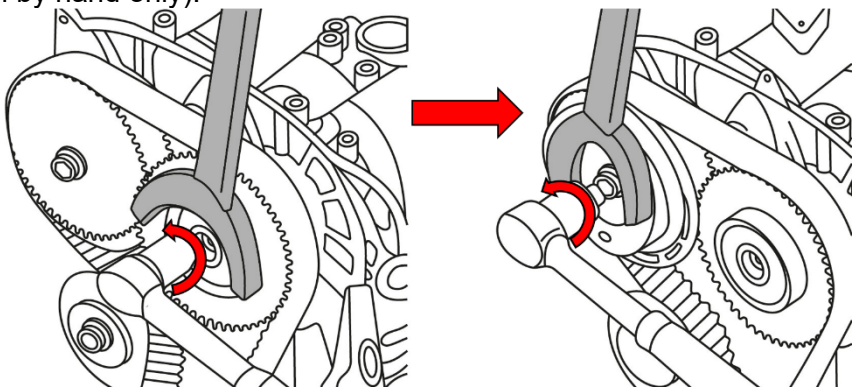
REMOVING THE CAMSHAFT DRIVE BELT

Lock the camshaft adapters (5) and (6) by lifting the red and blue locking levers and inserting the lever stop pins (12).



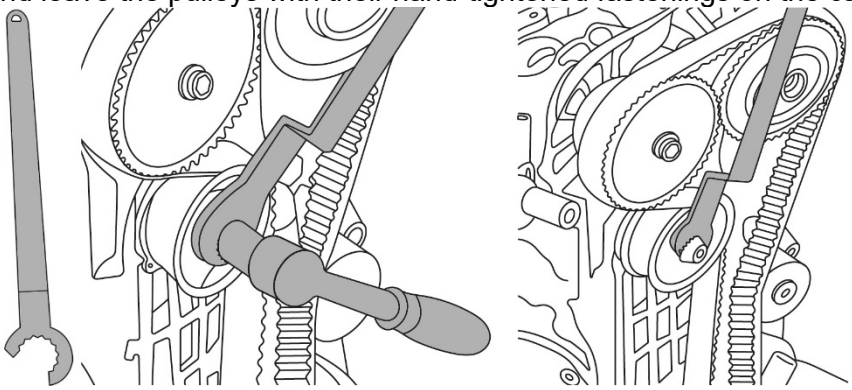
Using a suitable pulley holding tool, loosen the control valve of the intake camshaft adjuster. Loosen the bolt of the exhaust camshaft pulley using a suitable pulley holding tool and replace it with a new one (tighten by hand only).



NOTE: The securing bolt of the outlet pulley must not be reused.
WARNING: Never attempt to loosen or tighten the securing bolt of the output pulley against the locking tools of the camshafts or crankshaft.

TENSIONER ADJUSTMENT TOOL

While the crankshaft is still resting on the crankshaft locking pin (11) and the camshaft is locked as shown in the illustration, loosen the timing belt tensioner using the tensioner adjustment tool (13). Remove the belt and leave the pulleys with their hand-tightened fastenings on the camshaft.



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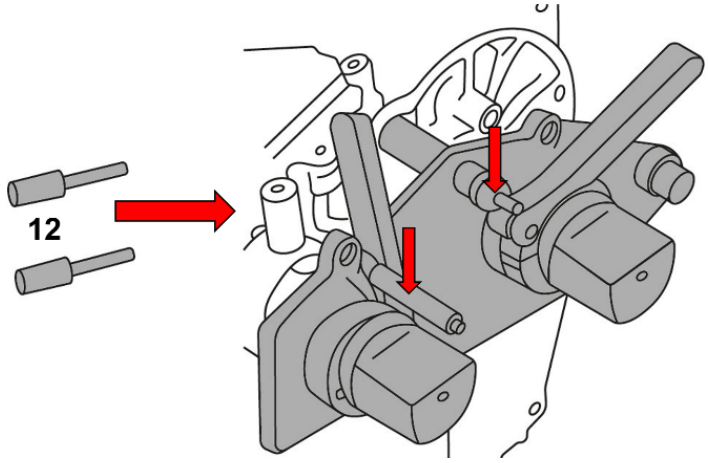
ASSEMBLING THE CAMSHAFT DRIVE BELT

NOTE: Before fitting the new belt, ensure that the camshaft adjuster's control valve and the crankshaft gear are in good condition, as described in the manufacturer's instructions.
Fit the new belt only on the crankshaft pulley while the crankshaft is still on the crankshaft locking pin (11) and both camshafts are locked as shown in the illustration.
Fit the lower timing belt cover and the crankshaft pulley according to the manufacturer's instructions using a suitable holding tool for the crankshaft pulley.
Tighten the crankshaft pulley bolt with the correct torque and angle (see manufacturer's specifications).
Fit the new belt onto the remaining pulleys in the following order:
Control disc→Exhaust camshaft→Intake camshaft.
Ensure that the camshaft pulley fasteners are only hand-tight and that the pulleys can rotate independently of the camshafts. Tension the belt with the tensioner adjuster (13) according to the manufacturer's instructions.
Check the angles of the camshaft adapter as described in the section "Checking the Timing" above to ensure that the camshafts have not moved.
Tighten the camshaft pulley fasteners using the appropriate holding tools to the torque specified by the manufacturer (only assembly torque, not full final torque, in this example approx. 20 Nm).
NOTE: During each angle check, the inclinometer must always be set to zero using the reference bar (7). This ensures that any change in the angle of the engine is compensated for, for example, when the vehicle is raised or lowered.
NOTE: The exhaust pulley securing bolt must not be reused.
WARNING: Never attempt to loosen or tighten it against the camshaft or crankshaft locking tools.

CHECK

Release the red and blue locking levers by removing the lever stop pins (12) as shown in the illustration.



Remove the crankshaft locking pin (11).
Turn the crankshaft 2 complete revolutions and stop just before it returns to TDC position and re-insert the crankshaft locking pin (11). Rotate the crankshaft until it stops at (11).
Recheck the camshaft angles as described in the "Checking the timing" section.
Compare the reading to the manufacturer's specifications. If no adjustment is required, the camshaft pulleys can be tightened to the manufacturer's specifications. If adjustment is required, perform the following procedure:
Initial camshaft adjustment and calculation of correction angles:
With the crankshaft still adjusted against the crankshaft pin (11), lock the camshafts as described in.
Using a suitable pulley holding tool, loosen the intake camshaft adjuster control valve and tighten by hand.
Using a suitable pulley holding tool, loosen the exhaust camshaft pulley bolt and tighten by hand.
Place the inclinometer (9) upside down against the inclinometer reference tool (9) and allow the reading to stabilize.

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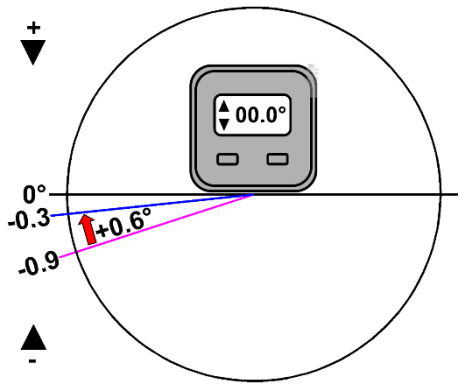
Holding the inclinometer against (7), press ZERO to set the inclinometer to 00.0° and move the inclinometer so that it sits on the flat side of the intake camshaft adapter (5) (correct side up).
Insert a 6mm Allen key into the end of the intake camshaft adapter (6) and while holding the Allen key, unlock the intake camshaft by removing the lever stop pin (12) (intake only).
Adjust the camshaft position using the Allen key until the inclinometer shows zero (00.0°), then lock the adapter with the locking lever and re-insert the lever stop pin (12). Repeat this process for the exhaust camshaft. Once both camshafts are zeroed and locked, tighten the camshaft pulley fasteners to 20 Nm. NOTE: Use a suitable tool to hold the camshaft in place when fastening it. Check again that both camshafts still show zero. If not, repeat the above process.

EXAMPLE

Use the vehicle manufacturer's engine-specific data and the measured camshaft angle from the previous section.
Engine code DADA (1.5L)
Specified intake angle -0.3° +/- 1.2° (manufacturer's data, engine specific)
Specified exhaust angle +1.1° +/- 1.2°

Current intake camshaft angle (measured angle) = (▲0,9°) -0,9°

Specified angle	-	Current angle	=	Intake correction angle
-0,3°	-	-0,9°	=	+0,6°

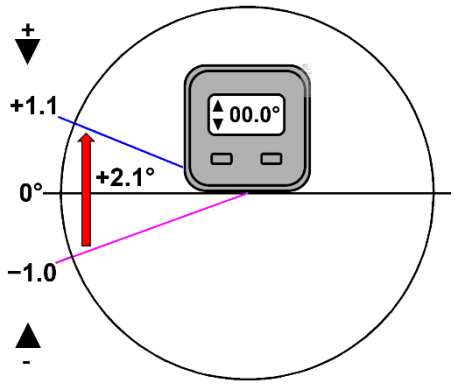


+0.6° clockwise from the current angle.

NOTE
Arrows indicate direction of rotation to reach zero.

Current outlet camshaft angle (measured angle) = (▲1,0°) -1,0°

Specified angle	-	Current angle	=	Outlet correction angle
+1,1°	-	-1,0°	=	+2,1°



+2,1° clockwise from the current angle.

NOTE
Arrows indicate direction of rotation to reach zero.

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FINAL TIMING ADJUSTMENT

NOTE: Once the correction angle has been determined, the camshafts must be zeroed and then adjusted from zero by the correction angle to compensate for engine manufacturer tolerances.
Using a suitable holding tool, loosen the intake camshaft phaser control valve and hand tighten.
Using a suitable holding tool, loosen the exhaust camshaft pulley bolt and hand tighten.
Place the inclinometer (9) upside down against the inclinometer reference tool (7) as shown in the illustration and allow the inclinometer to stabilize in value.
Holding the inclinometer (9), press ZERO to set the inclinometer to 00.0° and move the inclinometer to place it on the flat side of the intake camshaft adapter (5) (correct side up).
Insert a 6mm Allen key into the end of the intake camshaft adapter (5) and adjust the position of the camshaft using the Allen key until the corresponding calculated correction angle is displayed on the inclinometer. Then lock the adapter using the locking lever and place the lever stop pin (12).
Repeat this process for the exhaust camshaft.
Once both camshafts are zeroed and locked, tighten the camshaft pulley fasteners to 20 Nm.
NOTE: Use a holding tool to hold the camshaft in place.

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