Petrol Engine Setting/Locking Tool Kit

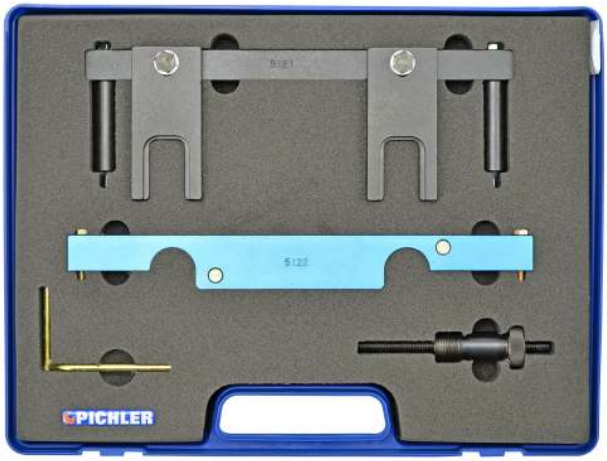
Applications:
BMW N43 1.6 & 2.0 Twin Camshaft Petrol Engines in:

BMW
1 SERIES (E81/E82/E87/E88)
116i 118i 120i

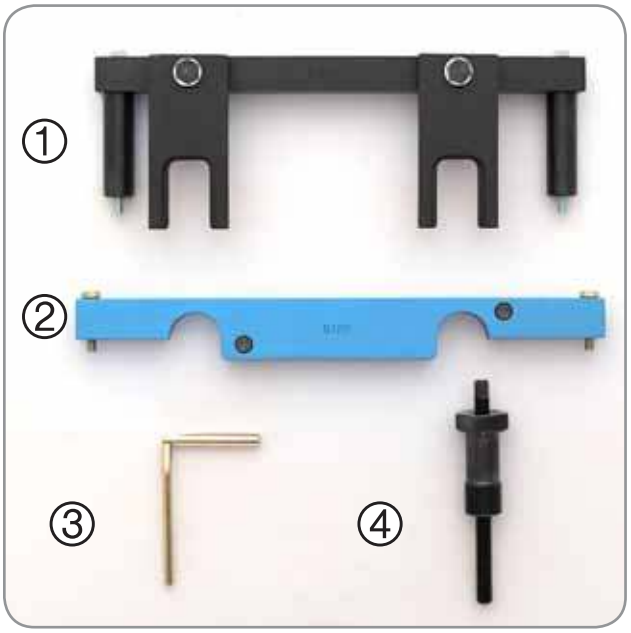
3 SERIES (E90/E91/E92/E93)
316i 318i 320i

5 SERIES (E60/E61)
520i

Engines: N43 **(1.6)** B16A, B16AA,
(2.0) B20K0, B20A, B20AA, B20AY



Kit Contents / Spares:



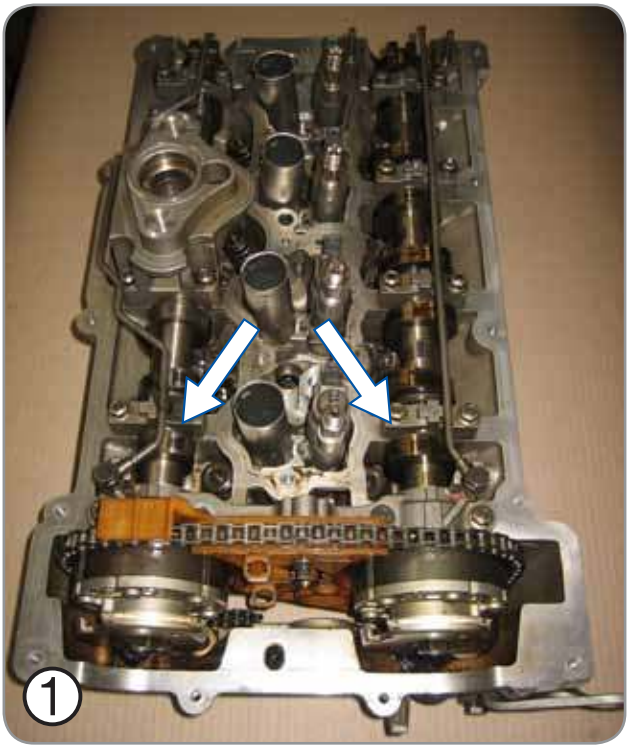
IMPORTANT: Always refer to the vehicle manufacturer's service instructions, or proprietary manual, to establish the current procedures and data. Product Information Sets detail applications and use of the tools with any general instructions provided as a guide only.

Item	Part Number	Description
1	5121	Camshaft Setting Tool
2	5122	VANOS Alignment Plate
3	4801	Flywheel Locking Pin
4	4803	Timing Chain Tensioner Pre-load Tool
-		Case + Insert

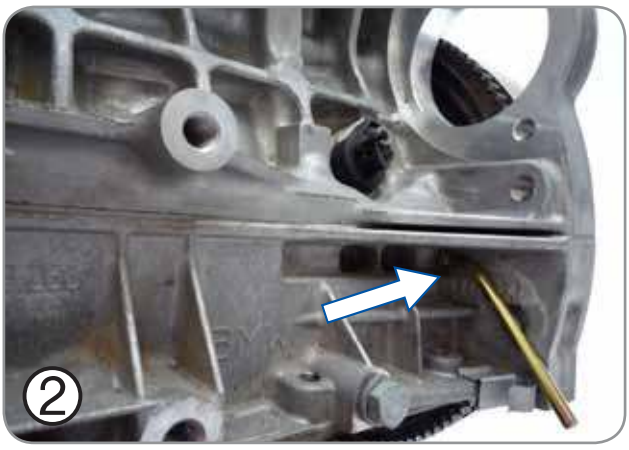
Introduction

This range of 1.6 and 2.0 direct injection petrol engines have VANOS (Variable camshaft timing) units fitted on both inlet and exhaust camshafts.
The N43 engine was introduced in 2007 and has been fitted in 1, 3 and 5 series models.

Checking Valve Timing



Turn the crankshaft, in normal direction of engine rotation, to TDC position on No.1 cylinder.
When TDC position has been achieved, the Inlet and Exhaust camshaft lobes for cylinder no.1 should be pointing upwards and towards the middle of the cylinder head.

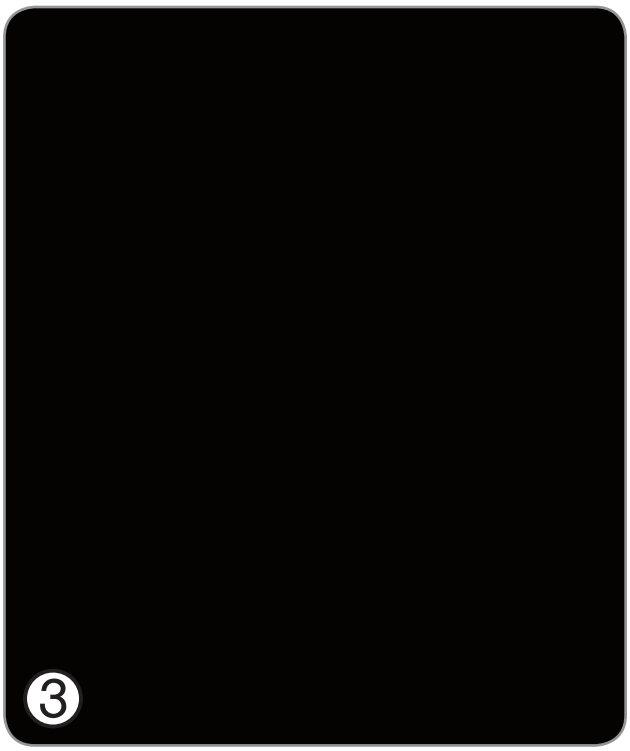


Insert **4801 Flywheel locking pin** through the datum hole, which is located underneath the starter motor, and into the timing hole in the flywheel.

NOTE: The **4801 Flywheel locking pin** can be difficult to locate into the datum hole and may be restricted by dirt/corrosion. Ensure that the datum hole is free from corrosion and foreign objects before fitting **4801 Flywheel locking pin**.

IMPORTANT: On automatic transmissions – there is a larger hole in the flywheel very near to the timing hole and checks are required to ensure that this hole has not been selected in error.

With **4801 Flywheel locking pin** inserted, use a wrench on the **crankshaft pulley bolt** and check that the engine will not rotate back and forth.

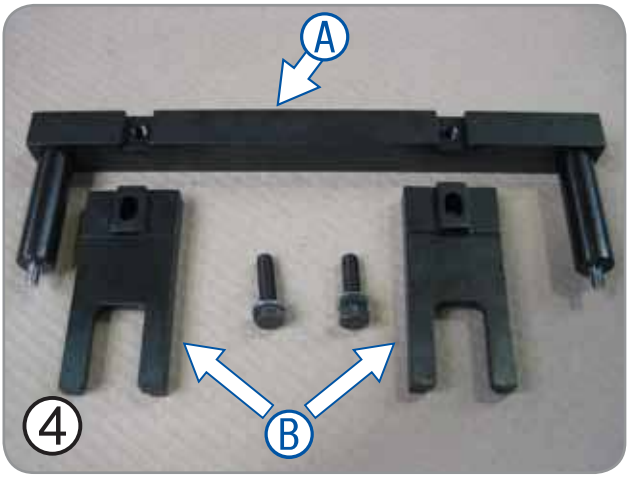


Valve timing checking/adjustment procedures can only be correctly carried out with the VANOS units 'locked' and be fixed to the camshafts.
When the engine is switched off, the VANOS units should return to their 'locked' position and be positively connected to the camshafts.

Using a spanner on the hexagon of the **INLET** camshaft, check whether the camshaft can be rotated independently of the VANOS unit. If so, carefully rotate the camshaft **against the direction of rotation** until the VANOS unit locks on to it.

Using a spanner on the hexagon of the **EXHAUST** camshaft, check whether the camshaft can be rotated independently of the VANOS unit. If so, carefully rotate the camshaft i**n the normal direction of rotation** until the VANOS unit locks on to it.

IMPORTANT: If the VANOS Units cannot be locked to the camshafts, it is likely they are faulty, and must be replaced.



5121 Camshaft setting tool comprises of a bridge section (A) complete with fixing bolts, plus 2x camshaft setting plates (B) that slide over the 'timing flats' on the camshafts to set the correct timing position.

Fit the **bridge section** of **5121 Camshaft setting too**l on to the cylinder head and retain in position using the two bolts provided.

NOTE: There are two slots on one side of the bridge section, these slots must be positioned so that they are on the camshaft side of the bridge, above the 'timing flats' of the camshafts.

Slide the **setting plates** of **5121 Camshaft setting tool** on to the 'timing flats' of each camshaft. Ensure that the setting plates are located in the slots of the bridge section. Attach the setting plates to the bridge section using the bolts provided.

If it is not possible to locate and secure both setting plates to the bridge section, the valve timing is not correct and will require adjustment.

Remove all engine timing tools.

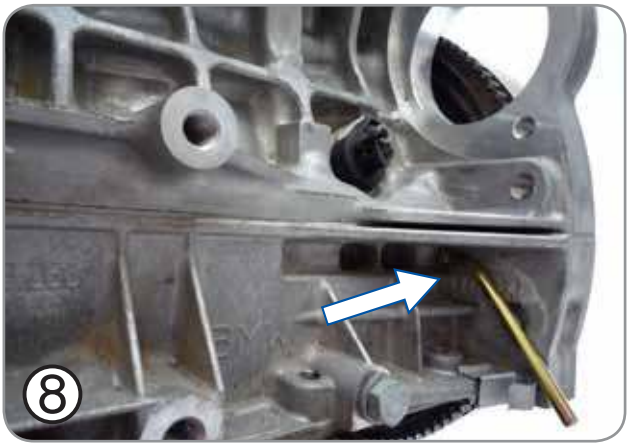
Adjusting Valve Timing

Slacken the bolts of the VANOS units on the Inlet and Exhaust camshafts.

WARNING: The bolts of the VANOS units will be tight.

It will be necessary to counter-hold against engine rotation at the crankshaft pulley centre bolt or on the hexagon of the camshaft.

DO NOT rely on 4801 Flywheel locking pin or 5121 Camshaft setting tool to counter-hold when loosening or tightening these bolts.



Ensure that **4801 Flywheel locking pin** is located in the timing hole in the Flywheel.

Fit the bridge section of **5121 Camshaft setting too**l on to the cylinder head and retain in position using the two bolts provided, ensuring that the two slots on the bridge section are positioned on the camshaft side of the bridge.

Slide the **setting plates** of **5121 Camshaft setting tool** on to the 'timing flats' of each camshaft.

Adjust the camshafts so that the setting plates are located in the slots of the bridge section. Attach the setting plates to the bridge section using the bolts provided.

NOTE: The Inlet and Exhaust camshaft lobes for cylinder no.1 should be pointing upwards and towards the middle of the cylinder head.

Remove the timing chain tensioner and fit **4803 Timing chain tensioner pre-load tool** in its place, tightening the centre screw until it makes contact with the tensioner rail but **does not apply pressure**.

Fit **5122 VANOS Alignment Plate** to the front of the VANOS units, ensuring that the location pegs enter the holes in the VANOS discs and that the alignment plate sits fully on the surface of the cylinder head.
Retain in position using the bolts provided.

Remove the centre bolts of the VANOS units on the inlet and exhaust camshafts and fit new bolts.
Fit the new bolts finger tight only at this stage, so that the units can rotate but not tilt on the camshafts.

Using a suitable torque wrench, tighten the centre screw of **4803 Timing chain tensioner pre-load tool** to **0.6Nm**.

Tighten the centre bolt of the VANOS unit on the **exhaust** camshaft to the specified torque **(20Nm + 180°)**.

Tighten the centre bolt of the VANOS unit on the **inlet** camshaft to the specified torque **(20Nm + 180°)**.

WARNING: It will be necessary to counter-hold against engine rotation at the crankshaft pulley centre bolt or on the hexagon of the camshaft.

DO NOT rely on 4801 Flywheel locking pin or 5121 Camshaft setting tool to counter-hold when loosening or tightening the centre bolts of the VANOS units.

Remove **4803 Timing chain tensioner pre-load tool** and refit the timing chain tensioner.

Remove **5121 Camshaft setting tool** and **5122 VANOS alignment plate**.

Remove **4801 Flywheel locking pin**.

NOTE: The flywheel pin should be easily removed from the datum hole, **DO NOT** apply excessive force to the pin when removing it from the datum hole.

During engine timing procedures, the flywheel may contact **4801 flywheel locking pin**, applying a small amount of pressure to the pin. This pressure can 'lock' the flywheel pin in the datum hole, making it difficult to remove.
Small rotational adjustment to the flywheel position, carried out at the crankshaft central bolt, will enable the pin to be removed easily.

After removing all engine timing tools, rotate the crankshaft **two full turns** (at the crankshaft pulley centre bolt) in the normal direction of rotation, returning to TDC position on No.1 cylinder.

Check the valve timing by refitting **4801 Flywheel locking pin** and **5121 Camshaft setting tool**, following the procedure shown in section **"Checking Valve Timing"**.

If the valve timing is incorrect, repeat the valve timing adjustment procedure, as shown in section **"Adjusting Valve Timing"**.

WARNING: Ensure that all tools have been removed from the engine.

Failure to remove all tools may result in damage to the engine and its component parts.