



INSTRUCTIONS FOR

# PETROL ENGINE SETTING/LOCKING KIT -

## BMW MINI, CITROEN, PEUGEOT - CHAIN DRIVE

MODEL NO: **VSE6131**

Thank you for purchasing a Sealey product. Manufactured to a high standard, this product will, if used according to these instructions, and properly maintained, give you years of trouble free performance.

**IMPORTANT:** PLEASE READ THESE INSTRUCTIONS CAREFULLY. NOTE THE SAFE OPERATIONAL REQUIREMENTS, WARNINGS & CAUTIONS. USE THE PRODUCT CORRECTLY AND WITH CARE FOR THE PURPOSE FOR WHICH IT IS INTENDED. FAILURE TO DO SO MAY CAUSE DAMAGE AND/OR PERSONAL INJURY AND WILL INVALIDATE THE WARRANTY. KEEP THESE INSTRUCTIONS SAFE FOR FUTURE USE.



Refer to instruction manual



Wear eye protection

### 1. SAFETY

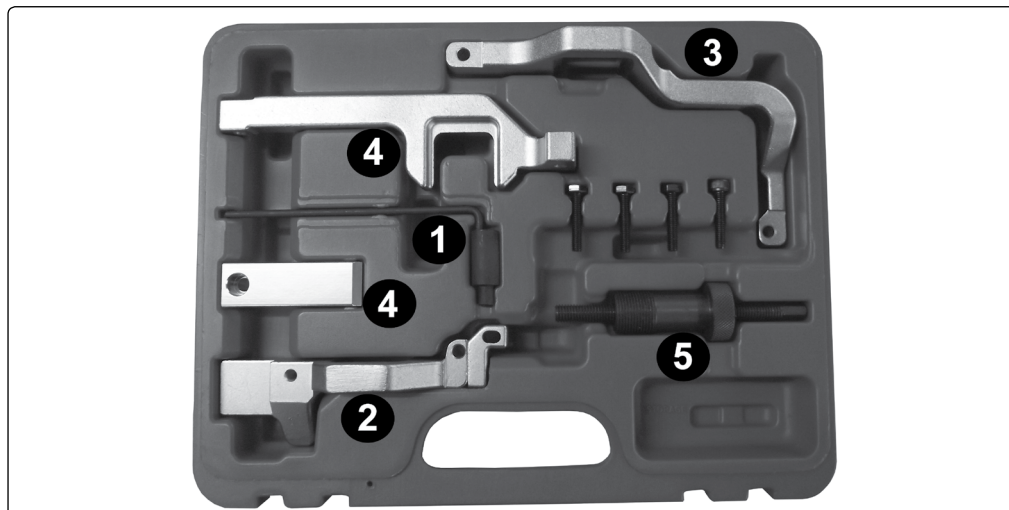
- WARNING!** Wear approved eye protection. Wear appropriate Personal Protective Equipment. A full range of Personal Protective Equipment is available from your Sealey dealer.
- WARNING!** Ensure that Health & Safety, Local Authority Regulations and general workshop practice Regulations are adhered to when using tools.
- ✖ **DO NOT** use tools if damaged.
- ✓ Maintain tools to ensure that they are in an adequate condition for safe use and optimum performance.
- ✓ Ensure that a vehicle that has been raised by a jack is adequately supported. Use axle stands.
- ✓ Wear suitable clothing to avoid snagging. **DO NOT** wear jewellery. Tie back long hair.
- ✓ Account for all tools, parts and components being used. **DO NOT** leave these in or near the engine. Return tools to suitable storage after use.
- ▲ **IMPORTANT!** These Instructions are provided as a guide only. Always refer to the vehicle manufactures' service instructions or a proprietary manual to establish the correct procedure and data.
- WARNING!** The warnings, cautions and instructions in this manual cannot cover all possible conditions and situations. The Operator / user must apply caution and common sense (good practical sense).
- ✓ When timing an engine, always prevent the engine from being turned over. Use a notice and/or inhibit the engine.
- WARNING!** Incorrect or out of phase camshaft timing can result in contact between the valve head and the piston crown. This will cause damage to the engine.

### 2. INTRODUCTION

Setting and Locking Kit suitable for timing 1.4 & 1.6 16v Valvetronic direct injection, chain drive petrol engines, fitted in BMW Mini, Peugeot and Citroen vehicles. Supplied in carry-case with comprehensive instructions.

### 3. CONTENTS

Item	Part No.	Description	OE tool BMW	OE tool Peugeot	OE tool Citroen
1	VSE6131.01	Flywheel locking pin	11 9 590	0197-BZ	0197-B
2	VSE6131.02	Exhaust camshaft setting tool	11 9 540	0197-A1	0197-A1
3	VSE6131.03	Inlet camshaft setting plate (N12/EP3/EP6)	11 9 550	0197-A3	0197-A3
4	VSE6131.04	Inlet camshaft setting plate assembly (N14/EP6D1/DTS)	11 9 550		
5	VSE5981-01	Chain tensioner pre-load tool	11 9 340		



## 4. APPLICATIONS

Make: BMW

Model:

Mini Clubvan R55 (12-14), Mini Clubman R55 (08-14), Mini Countryman R55 (07-10), Mini Clubman R56/R57 (07-15), Mini R56/R57 (08-15), Mini Coupe R58 (11-15), Mini Roadster R59 (08-15), Mini Clubman R60 (10-14), Mini Clubvan R60 (12-14), Mini Roadster R61 (13-15), Mini Paceman R61 (14-15), Mini Countryman R60 (10-17)

Citroen:

C4 (08-11), C4 Picasso (08-13) C4 Grand Picasso (13-15)

Peugeot

207 (06-14), 207CC (07-15), 308 (07-15), 3008 (09-15), 5008 (09-15)

**Engine codes (Petrol 1.4, 1.6v N12/N14/N16 Mini):**

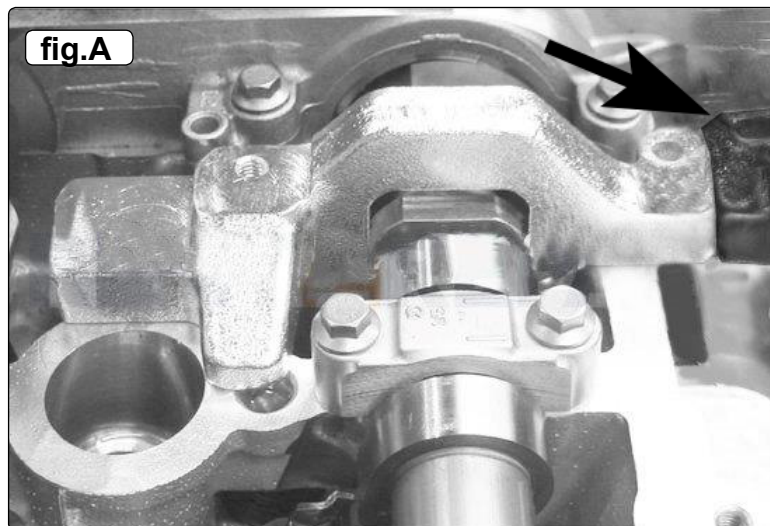
1.4: N12B14, N12B14AB

1.6: EP3(8FS), EP3C(8FR), EP6(5FW), EP6C(5FS), EP6CDT(5FV), EP6DT(5FT), EP6DT(5FX), EP6DTS(5FY), N14B16A, N14B16CD, N14B16T0, N14B16CD/T0, N16B16A, N16B16K0, N16B16A/M0, N16B16A/MO, N16B16M0, N16B16U0, N18B16A, N18B16A/MC.

## 5. INSTRUCTIONS

The tools within this kit are necessary to correctly set the engine camshaft timing on BMW N12, PSA EP6 engines, and BMW N14, N16 and PSA EP6DT/DTS engines. These engines were jointly developed between BMW and Peugeot/Citroen( PSA) Group. These instructions cover the process for setting the camshafts and crankshaft positions when removal of the cylinder head, camshafts or timing chain has taken place. On engines with variable valve timing it may assist reassembly to mark the various components before dismantling. You are advised to read the instructions with this kit fully before commencing work on the engine.

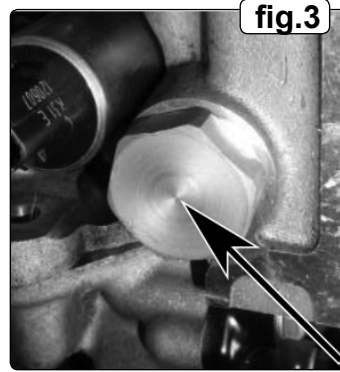
**Note: On vehicles equipped with a turbocharger, the VSE6131.02 has a removable section which can be unbolted. This allows the tool to be set in the correct position without the need to remove the turbocharger, see fig.A and fig.6.**



For further information please refer to the relevant manufacturer's documentation and follow the instructions shown in a reputable workshop manual.

### 5.1. Checking the camshaft timing on N12/EP3/EP6 1.4 & 1.6 16V Valvetronic engines.

- **NOTE:** the camshaft timing is not set when a piston is at TDC but when all the pistons are level. Do not turn the engine in the opposite direction of rotation.
- 5.1.1. Remove the camshaft cover; rotate the engine in the normal direction of rotation until the flywheel locking pin (VSE6131-01) (fig.1) can be located in the flywheel via the datum hole. As a double check ensure the engine is in the correct position by making sure all the pistons are at the same height via the spark plug holes.
- 5.1.2.. Check the camshaft position which should now be as follows;  
The inlet camshaft should have (IN) visible and pointing upwards, the cam lobe on cylinder one (chain end of the engine) should be facing upwards and pointing to the left. The exhaust camshaft should have (EX) visible and pointing upwards, the cam lobe on cylinder one (chain end of the engine) should be facing upwards and pointing to the right.
- **NOTE:** on the camshafts the square machined area has a crescent on one of its faces, this must be facing downwards.
- 5.1.3. At this point the Vanos units can be tested for operation by placing a spanner on the square area on the end of the camshaft; if there is no connection to the camshaft the Vanos units are faulty.
- 5.1.4. Place the exhaust camshaft setting tool (VSE6131-02) over the square section at the rear end of the exhaust camshaft, make sure the tool rests completely on the cylinder head surface and tighten down with the bolt provided.
- 5.1.5. Place the inlet camshaft setting tool (VSE6131-03) over the square section at the rear end of the inlet camshaft, make sure the tool rests completely on the cylinder head surface and also onto the exhaust camshaft setting plate, and tighten down with the bolts provided. If required a slight movement of the camshafts to allow the tooling to locate correctly is acceptable (fig.2)
- 5.1.6. If the camshaft timing is set correctly both parts of the tooling will fit completely flush against the surface of the cylinder head. If this cannot be achieved then the camshaft timing will need to be adjusted.



## 5.2. Adjusting the camshaft timing on N12/EP3/EP6 1.4 & 1.6 16V Valvetronic engines

5.2.1. Remove the timing chain tensioner, fig.3.

5.2.2. To adjust the camshaft timing the Vanos units need to be released. This is achieved by releasing the central fixing bolts, use a spanner on the square of the camshafts to counter the fixing bolt release action. Remove all tooling before releasing the Vanos units.

**DO NOT** use the tooling to counter hold the camshaft when releasing the Vanos unit fixing bolts.

5.2.3. Be aware the Vanos fixing bolts are likely to be very tight.

5.2.4. The Vanos unit fixing bolts **MUST** be discarded and replaced with new bolts.

5.2.5. With the Vanos unit fixing loosened the camshaft timing can now be adjusted.

5.2.6. Follow the same procedure for checking the camshaft timing, it should now be possible to fit the exhaust and inlet setting tools correctly and flush to the cylinder head and to each other, secure with the fixing bolts provided.

5.2.7. Remove the timing chain tensioner from the cylinder head and insert the timing chain pre-load tensioner tool (VSE6131-05). Screw the adjuster bolt in by hand until it makes contact with the chain tensioner guide; do not tighten any further.

5.2.8. The timing chain wear can be measured at this point if required, measure the length of the pre-tensioning tool, refer to specific manufacturers data for the maximum allowed wear. (fig.4)

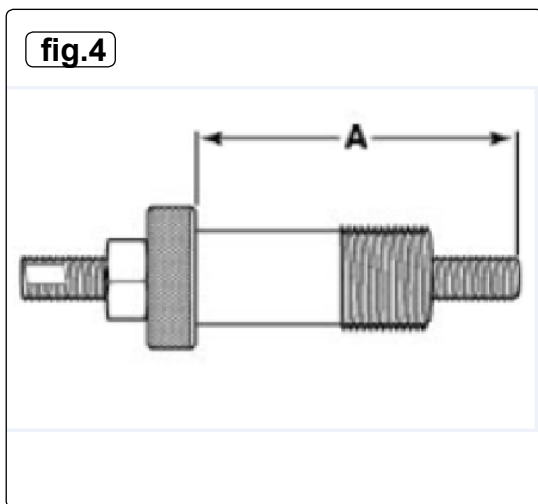
5.2.9. Tighten the adjuster bolt to 0.6Nm using a suitable torque wrench.

5.2.10. Replace the Vanos unit fixing bolts using **new bolts**, tighten bolts in the order of the exhaust camshaft fixing bolt first, followed by the inlet camshaft bolt second. The specified torque for both these bolts is 20Nm + 90 degrees, +90 degrees. (fig.5)

5.2.11. Undo the pre-tensioner adjuster screw bolt and remove the timing chain pre-load tensioner tool (VSE6131-05) Install the timing chain tensioner.

5.2.12. Remove all tooling and rotate the engine in the direction of rotation twice. Follow the procedure for checking the camshaft timing to ensure it has been set correctly.

If correct remove all tooling and reassemble the engine.



## 5.3. Checking the camshaft timing on N14/EP6DT/DTS 1.6 16V Direct Injection Engines.

- **NOTE:** that the camshaft timing is not set when a piston is at TDC but when all the pistons are level. Do not turn the engine in the opposite direction of rotation.

5.3.1. Remove the camshaft cover; rotate the engine in the normal direction of rotation until the flywheel locking pin (VSE6131-01) (fig.1) can be located in the flywheel via the datum hole. As a double check ensure the engine is in the correct position by making sure all the pistons are at the same height via the spark plug holes.

5.3.2. Check the camshaft position which should now be as follows;

The inlet camshaft should have (IN) visible and pointing upwards, the cam lobe on cylinder one (Chain end of the engine) should be facing upwards and pointing to the right.

The exhaust camshaft should have (EX) visible and pointing upwards, the cam lobe on cylinder one (Chain end of the engine) should be facing upwards and pointing to the left.

- **NOTE:** on the camshafts the square machined area has a crescent on one of its faces, this must be facing downwards

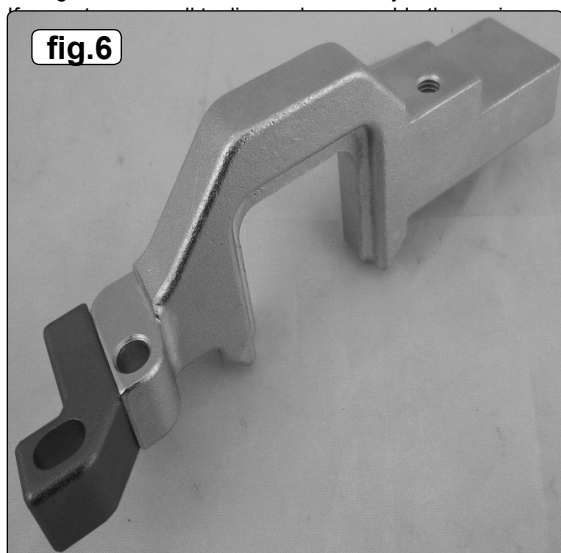
5.3.3. At this point the Vanos units can be tested for operation by placing a spanner on the square area on the end of the camshaft; if there is

no connection to the camshaft the Vanos units are faulty.

- 5.3.4. Place the exhaust camshaft setting tool (VSE6131-02) over the square section at the rear end of the exhaust camshaft, make sure the tool rests completely on the cylinder head surface and tighten down with the bolt provided.
- 5.3.5. Place the inlet camshaft setting tool (VSE6131-03) over the square section at the rear end of the inlet camshaft, make sure the tool rests completely on the cylinder head surface and also onto the exhaust camshaft setting plate, tighten down with the bolts provided. If required a slight movement of the camshafts to allow the tooling to locate correctly is acceptable. (fig.2)
- 5.3.6. If the camshaft timing is set correctly both parts of the tooling will fit completely flush against the surface of the cylinder head. If this cannot be achieved then the camshaft timing will need to be adjusted.

#### 5.4. Adjusting the Camshaft Timing on N14/EP6DT/DTS 1.6 16V Direct Injection Engines.

- 5.4.1. Remove the timing chain tensioner. (fig.3)
- 5.4.2. To adjust the camshaft timing the Vanos units need to be released. This is achieved by releasing the central fixing bolts, use a spanner on the square of the camshafts to counter the fixing bolt release action. Remove all tooling before releasing the Vanos units. **DO NOT** use the tooling to counter hold the camshaft when releasing the Vanos unit fixing bolts.
- 5.4.3. Be aware the Vanos fixing bolts are likely to be very tight.
- 5.4.4. The Vanos unit fixing bolts **MUST** be discarded and replaced with new bolts.
- 5.4.5. With the Vanos unit fixing loosened the camshaft timing can now be adjusted. Follow the same procedure for checking the camshaft timing, it should now be possible to fit the exhaust and inlet setting tools correctly and flush to the cylinder head and to each other, secure with the fixing bolts provided.
- 5.4.6. Remove the timing chain tensioner from the cylinder head and insert the timing chain pre-load tensioner tool. (VSE6131-05) Screw the adjuster bolt in by hand until it makes contact with the chain tensioner guide, **DO NOT TIGHTEN ANY FURTHER.**
- 5.4.7. The timing chain wear can be measured at this point if required, measure the length of the pre-tensioning tool, refer to specific manufacturers data for the maximum allowed wear (fig.4).
- 5.4.8. Tighten the adjuster bolt to 0.6Nm using a suitable torque wrench.
- 5.4.9. Replace the Vanos unit fixing bolts using **new bolts**, tighten bolts in the order of the exhaust camshaft fixing bolt first, followed by the inlet camshaft bolt second. The specified torque for both these bolts is 20Nm + 90 degrees, +90 degrees. (fig.5)
- 5.4.10. Undo the pre-tensioner adjuster screw bolt and remove the timing chain pre-load tensioner tool (VSE6131-05) Install the timing chain tensioner. Remove all tooling and rotate the engine in the direction of rotation twice. Follow the procedure for checking the camshaft timing to ensure it has been set correctly.



**Environmental Protection**  
Recycle unwanted materials instead of disposing of them as waste. All tools, accessories and packaging should be sorted, taken to a recycling centre and disposed of in a manner which is compatible with the environment.  
When the product becomes completely unserviceable and requires disposal, drain off any fluids (if applicable) into approved containers and dispose of the product and the fluids according to local regulations.

**NOTE:** It is our policy to continually improve products and as such we reserve the right to alter data, specifications and component parts without prior notice.

**IMPORTANT:** No liability is accepted for incorrect use of this product.

**WARRANTY:** Guarantee is 12 months from purchase date, proof of which will be required for any claim.



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