



INSTRUCTIONS FOR:
DIESEL ENGINE SETTING/LOCKING KIT -
BMW/MINI N47/N57 1.6, 2.0, 3.0 - CHAIN DRIVE
 MODEL No: **VSE6121**

Thank you for purchasing a Sealey product. Manufactured to a high standard, this product will, if used according to these instructions and maintained properly, 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!** Ensure Health and Safety, local authority and general workshop practice regulations are adhered to when using tools.
- × **DO NOT** use tools if damaged.
- ✓ Maintain tools in good and clean condition for best and safest performance.
- ✓ Ensure that a vehicle which has been jacked up is adequately supported with axle stands.
- ✓ Wear approved eye protection. A full range of personal safety equipment is available from your Sealey dealer.
- ✓ Wear suitable clothing to avoid snagging. **DO NOT** wear jewellery and tie back long hair.
- ✓ Keep children and unauthorised persons away from the work area.
- × **DO NOT** attempt to start engine or move vehicle whilst in gear with the timing devices fitted.
- ✓ **Always** display a warning notification on steering wheel when timing engine components.
- ✓ Account for all tools, locking bolts, pins and parts being used and **DO NOT** leave them in or near the engine.
- ✓ Ensure all pieces are returned to the case and store this in a safe, dry, childproof location.
- WARNING!** Incorrect or out of phase camshaft timing can result in contact between valve head and piston crown causing damage to the engine.

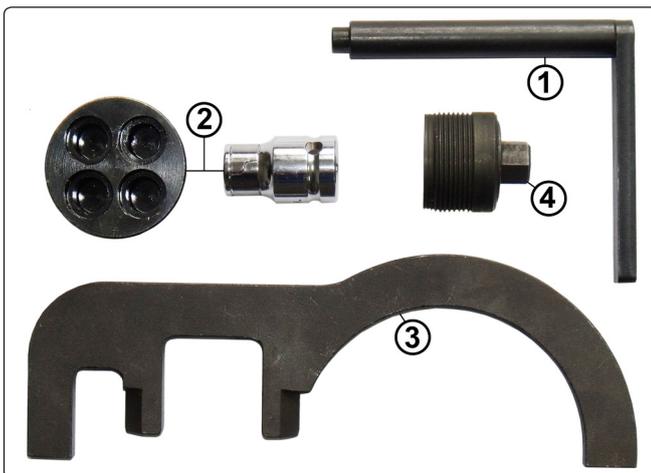
IMPORTANT: These instructions are provided as a guide only. Always refer to the vehicle manufacturer's service instructions, or a proprietary manual, to establish the current procedure and data.

WARNING: The warnings, cautions and instructions in this manual cannot cover all possible conditions and situations that may occur. It must be understood that common sense and caution are factors which cannot be built into this product, but must be applied by the operator.

2. INTRODUCTION

Essential tools for timing the BMW/Mini N47/N57 1.6, 2.0 and 3.0 diesel chain drive engines. Kit includes camshaft setting plate, flywheel locking pin and crankshaft turning tool. Kit also includes HP pump sprocket retaining tool required during pump removal/replacement applications.

3. CONTENTS



Contents			OEM Number
Item	Part Number	Description	BMW/Mini
1	VSE6121.01	Flywheel Locking Pin	11.5.320
2	VSE6121.02	Crankshaft Turning Tool	11.6.480
3	VSE6121.03	Camshaft Setting Plate	11.8.760
4	VSE6121.04	HP Pump Sprocket Retaining Tool	11.8.740

4. APPLICATIONS

Vehicle Applications:

Make:	Model:	Year:
BMW:	116d E81/82/87/88	(08-12)
	118d E81/82/87/88	(07-14)
	120d E81/82/87/88	(07-14)
	123d E81/82/87/88	(07-14)
	316d E90/91/92/93	(09-12)
	318d E90/91/92/93	(07-12)
	320d E90/91/92/93	(07-12)
	325d E90/91/92/93	(10-14)
	330d/xd E90/91/92/93	(08-14)
	520d E60/61	(07-10)
	525d F10/11	(10-12)
	530d F10/11	(10-13)
	530dGT F07	(09-12)
	535d F10/11	(10-12)
	535dGT F07	(10-12)
	730d/Ld F01/02/04	(08-12)
	740d F01/02/04	(09-12)
	740d xDrive F01/02/04	(09-12)
	X1 sDrive 18d E84	(09-12)
	X1 sDrive 20d E84	(09-12)
	X1 xDrive 18d E84	(09-14)
	X1 xDrive 20d E84	(09-12)

Make:	Model:	Year:
BMW:	X1 xDrive 23d E84	(09-12)
	X3 2.0d E83	(07-10)
	X3 xDrive 18d E83	(08-10)
	X3 xDrive 30d E83	(11-12)
	X5 3.0d E70	(10-12)
	X5 xDrive 40d E70	(10-13)
	X6 xDrive 30d E71/72	(10-14)
	X6 xDrive 40d E71/72	(10-14)

Make:	Model:	Year:
Mini:	Clubman	(10-14)
	Clubvan	(12-14)
	Countryman	(10-14)
	Mini	(10-14)
	Paceman	(13-14)
	Roadster	(12-14)

Engine Codes:

N47/N47S: C16K1, C16U1, C20K1, C20U1, D20A, D20B, D20O0, D20T0, D20U0.

N57: D30O0, D30O1, D30T0, D30U0.

5. INSTRUCTIONS

The BMW N47 2.0 and N57 3.0 twin camshaft diesel engines replace the M47/M57 engines - the N47 being introduced in 2005 followed by the N57 in 2008.

Currently the N47 range is fitted in the 1, 3 and 5 Series, X1 and X3 and some Mini models, with the N57 engines fitted in the 3, 5 and 7 Series, X3, X5 and X6.

The timing chain connects the crankshaft to the inlet camshaft and the inlet and exhaust camshafts are connected by gears.

In addition to the required timing tools VSE6121 Kit also includes the HP Pump Sprocket Retaining Tool which is used to retain the position of the pump sprocket during removal of the HP pump, thus reducing the level of engine disassembly required for pump replacement. To check and adjust the timing it will be necessary to remove the camshaft cover in order to gain access to the camshafts, sprocket and gears.

5.1. Checking timing.

5.1.1. To check the engine timing is correct the Flywheel Locking Pin is used to lock the crankshaft at TDC No.1 cylinder and the Camshaft Setting Plate is fitted to the exhaust camshaft to check correct camshaft position. It will be necessary to use the Crankshaft Turning Tool supplied in the kit to turn the engine to insert the Flywheel Locking Pin fully.

5.1.2. VSE6121.01 Flywheel Locking Pin.

There is a sealing plug in the access hole where the Flywheel Locking Pin is inserted. Remove the plug and partially insert the Pin into the access hole ready to locate the timing hole in the flywheel as the crankshaft is turned to TDC (fig.1).

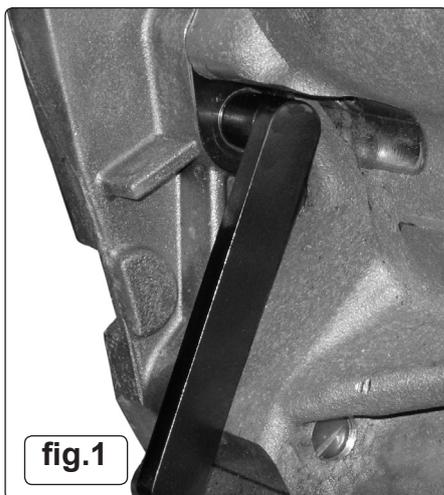


fig.1



fig.2

5.1.3. VSE6121.02 Crankshaft Turning Tool.

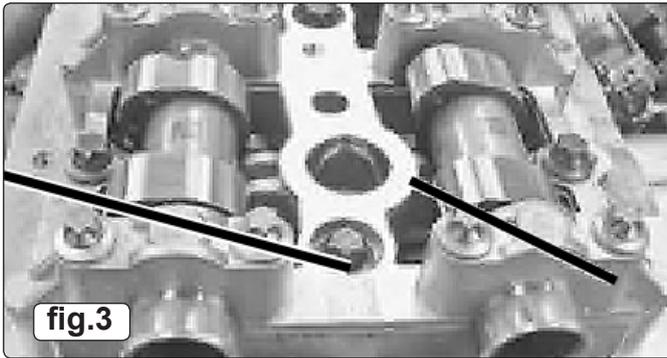
The engine can only be turned at the crankshaft pulley.

Fit VSE6121.02 Turning Tool onto the heads of the 4 x pulley retaining bolts and use a ratchet spanner in the square drive provided to turn the crankshaft/engine (fig.2).

IMPORTANT: The engine should only be turned in the direction of normal engine rotation. It **MUST NOT** be turned in the other direction.

5.1.4. Turn the engine slowly to TDC No.1 cylinder, and insert the Flywheel Locking Pin fully to locate the timing hole in the flywheel.

- 5.1.5. The correct TDC position is confirmed by the camshaft lobes on No.1 cylinder pointing slightly upwards at an angle and to the left when viewed looking in a direction towards the back of the camshaft gears (fig.3).
NOTE: It should also be possible to read the part numbers on top of the camshafts.



- 5.1.6. The timing marks on the camshaft gears must be aligned (fig.4).

5.1.7. **VSE6121.03 Camshaft Setting Plate.**

The Camshaft Setting Plate is installed onto the flats on the exhaust camshaft.

For the camshaft timing to be correct, the VSE6121.03 Setting Plate must be in contact with, and sit flush on both sides, of the surface of the cylinder head, without a gap (fig.5).

Should the gear timing marks not align or the Camshaft Setting Plate not sit fully flush on the cylinder head, without a gap, timing adjustment will be required.



5.2. **Adjusting timing.**

- 5.2.1. In order to adjust the timing the exhaust camshaft must be removed.

Lock the crankshaft at TDC No.1 cylinder by using VSE6121.01 Locking Pin to lock the flywheel (refer to 5.1. "Checking timing").

Check that the camshaft lobes on No.1 cylinder are pointing slightly upwards at an angle to the left, when viewed looking in a direction towards the back of the camshaft gears, and that it is also possible to read the part numbers on top of the camshafts.

Release the bearing cap bolts (A1 to A5) working from the outside, inwards, and place all parts on a clean tray in identifiable order. Release the chain tensioner and remove the exhaust camshaft by pulling upwards.

- 5.2.2. Remove the camshaft sprocket bolts and detach the sprocket/chain (fig.6).

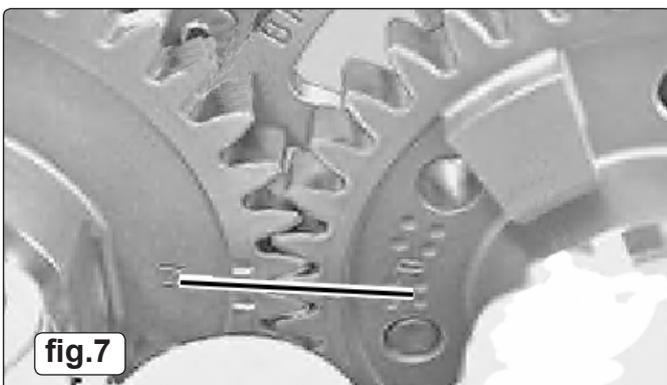
- 5.2.3. Position the inlet camshaft /gear as shown, noting the installation position of the roller cam follower.

Fit the exhaust camshaft/gear making sure that the timing marks on the gears align correctly (fig.7).

- 5.2.4. Fit all bearing caps ensuring they are returned in correct positions and orientation (apply engine oil to bearing surfaces during installation), and tighten bolts working from the inside, outwards.

- 5.2.5. Place the camshaft sprocket with the timing chain onto the inlet camshaft, screw in the 3 retaining bolts ensuring they are located in the centre of the elongated slots. Tighten the bolts to 10Nm.

- 5.2.6. Slacken the 3 retaining bolts approx. 1/4 turn thus allowing the sprocket to turn, but not tilt, during chain tensioning. Install the chain tensioner.



- 5.2.7. Fit the Camshaft Setting Plate onto the flats on the exhaust camshaft ensuring that it is in contact with, and sits fully on, both sides of the surface of the cylinder head, without a gap (fig.8).

- 5.2.8. Tighten the inlet camshaft sprocket retaining bolts.

- 5.2.9. Remove the Flywheel Locking Pin and Camshaft Setting Plate and turn the engine over, by hand, two complete turns, using the VSE6121.02 Turning Tool. Return to TDC No.1 cylinder position.

IMPORTANT: The engine should only be turned in the direction of normal engine rotation. It **MUST NOT** be turned in the other direction.

- 5.2.10. Check the timing by fitting the Flywheel Locking Pin and Camshaft Setting Plate and check the timing marks on the camshaft gears align correctly.

5.3. HP Pump Removal/Installation – General Guide.

VSE6121.04 HP Pump Sprocket Retaining Tool.

The HP Pump Sprocket Retaining Tool is used to retain the position of the pump sprocket during removal of the HP pump, thus maintaining the chain assembly and engine timing in place and reducing the level of engine disassembly required.

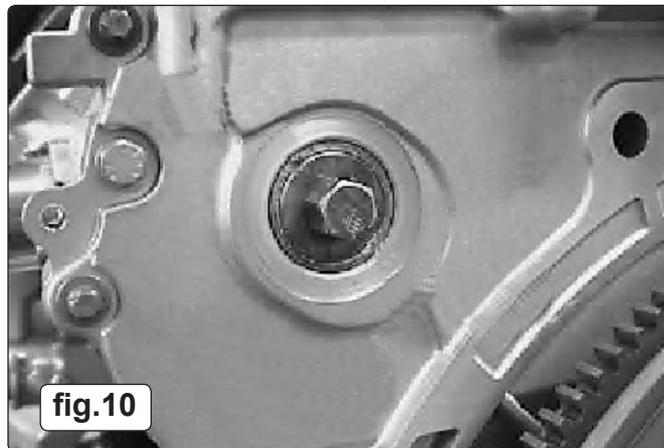
5.3.1. Removal.

Using VSE6121.02 Crankshaft Turning Tool, turn the engine to TDC No.1 cylinder and 'lock' the crankshaft using VSE6121.01 Flywheel Locking Pin (as described in 5.1. "Checking timing").

The HP pump must be prepared for removal by disconnecting fuel feed and return lines.

IMPORTANT: During this preparation the alternator should be covered to protect against spillage and all entry points to the fuel system must be sealed against ingress and contamination.

5.3.2. Remove the sealing plug from the engine to access the HP pump sprocket bolt (fig.9).



5.3.3. Screw in VSE6121.04 Retaining Tool so it enters fully into the threads of the sprocket and then remove the central part of the tool (fig.10).

IMPORTANT: The main body of the tool **MUST NOT** be removed until the HP pump has been refitted.

5.3.4. Remove the HP pump support.

5.3.5. Release the retaining screw on the front of the pump and the mounting bolt on the side of the timing case. Release the pump sprocket centre bolt. **NOTE:** It will remain in place during the application.

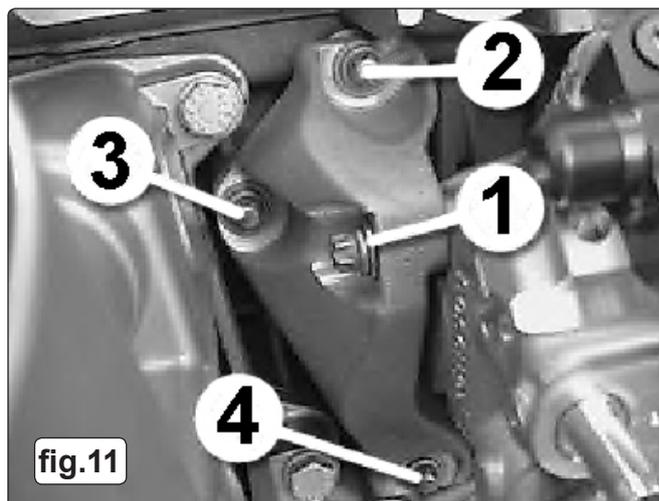
5.3.6. Installation.

To insert the HP pump shaft into the sprocket it may be necessary to turn the pump through a number of degrees and rotate it back into its mounting position.

A new pump will probably require the shaft to be turned to align the keyway position

IMPORTANT: Turn the shaft at its maximum diameter, not at the taper or keyway area as damage to the shaft/sprocket will result.

4.3.7. Fit the retaining screw and mounting bolt and install the support bracket.



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 dispose of it 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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