



INSTRUCTIONS FOR

DIESEL ENGINE SETTING/LOCKING KIT - BMW/MINI 1.5, 1.6, 2.0, 3.0 - CHAIN DRIVE

MODEL NO: **VSE6121A**

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
Instructions



Wear Eye
Protection



Wear Protective
Clothing

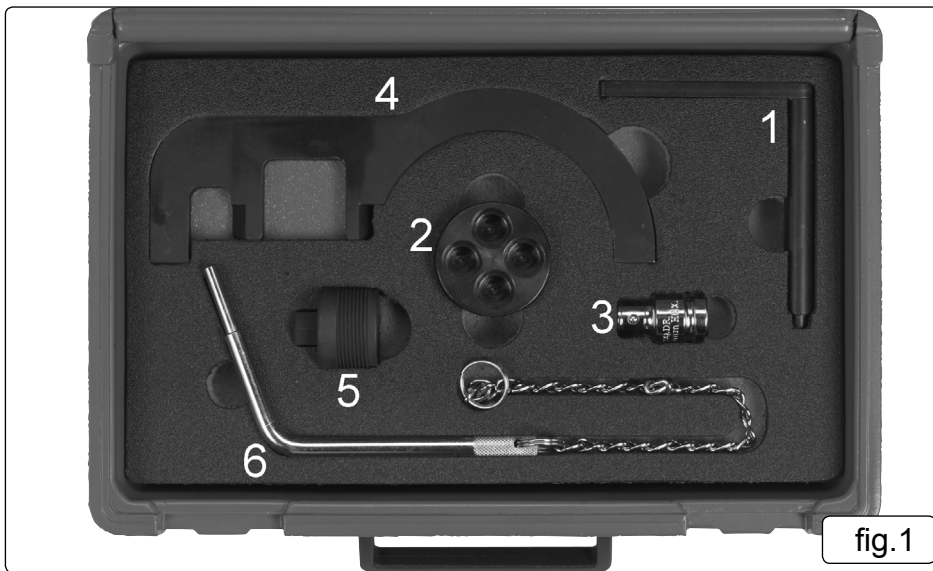
1. SAFETY

- 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.
- × **DO NOT** attempt to start or move a vehicle whilst in gear and with timing devices fitted.
- ✓ 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.
- ✓ When not in use, store in a safe, dry childproof place.
- ✓ Keep children and unauthorised persons away from the work area.
- ▲ **IMPORTANT!** These instructions are intended as a guide only. Always refer to the vehicle manufacturer's service instructions or a proprietary manual to establish the correct procedure and data.
- WARNING!** The warnings, conditions 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

This kit contains the essential tools for timing the BMW/Mini N47/N57/B37/B47 1.6, 2.0 and 3.0 diesel chain drive engines. Kit includes camshaft setting plate, flywheel locking pins and crankshaft turning tool. Kit also includes HP pump sprocket retaining tool required during pump removal/ replacement on N47/N57 applications.

Note: This kit provides the tooling to check and adjust the valve timing on the B37/B47 engine range. This range of engines has the timing chain at the rear of the engine. If timing chain replacement is required, this will require the removal of the engine/transmission, flywheel/drive plate, sump, timing cover and cylinder head. Additional tooling may be required and the use of a proprietary workshop manual to complete this operation is strongly advised.



Contents			
Item	Part No	Description	OEM Number
1	VSE6121.01	Flywheel Locking Pin	11.5.320
2	VSE6121.02	Crankshaft Turning Tool	11.6.480
3	VSE6121.02	Crankshaft Turning Tool	11.6.480
4	VSE6121.03	Camshaft Setting Plate	11.8.760
5	VSE6121.04	HP Fuel Pump Sprocket Retaining Tool	11.8.740
6	VSE6121.05	Flywheel Locking Pin	288-380

3. APPLICATIONS

Vehicle Applications									
Make	Model	Year	Make	Model	Year	Make	Model	Year	
BMW	116d F20/21	08-17	BMW	325d E90/91/92/93	07-14	BMW	X1 F48	09-17	
	118d F20/21	07-17		330d E90/91/92/93	08-17		X3 F25	07-17	
	120d E81/82/87/88	07-14		335d F30/31	13-17		X4 F26	14-17	
	123d E81/82/87/88	07-14		418d F32	15-17		X5 E70	14-17	
	125d F20/21	11-17		420d Cabriolet F33	15-17		X6 E71/72	08-17	
	214d F45	14-17		420d F36	15-17	MINI	F55	14-17	
	214d Grand Tourer F46	14-17		425d F32	11-16		F56	14-17	
	218d	11-17		435d F32	14-17		R55	10-14	
	220d F45	11-17		518d F10/11	14-17		R56/57	10-15	
	220d Coupe F22	11-17		520d E60/61	07-13		R58	11-14	
	220d Cabriolet F23	11-17		525d F10/11	10-12		R59	12-14	
	225d Coupe F22	11-17		530d F10/11	09-15		R60	10-17	
	225d Cabriolet F23	11-17		535d F10/11	10-17		R61	13-17	
	316d F30/31	09-17		640d F12/13	11-17				
	318d E81/82/87/88	07-14		730d F01/02/04	08-12				
	318d F34	15-17		740d F01/02/04	09-12				
	320d E90/91/92/93	07-13		750d F01/02/04	12-15				

Engine	Engine Codes
1.5	B37C15A, B37D15A.
1.6	C16K1, C16U1.
2.0	N47D20A, N47D20B, N47D20K1, N47D20U1, N47D20O1, N47D20, N47D20T1, N47D20C, N47D20D, N47D20U0, N47TD20U1, N47TD20, N47TD20O1, B47C20A, B47C20B, B47D20A, B47D20B
3.0	N57D30U0, N57D30O0, N57D30O1, N57B30B, D20D, N47D20D, N57D30T0, N57D30T1, N57D30B/T1, N57D30BT0, N47D20O0, N47SD20T0, N57D30B/T0, N57D30C.

4. OPERATION

4.1. 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. The B37/B47 modular engine range was introduced in 2014. 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 on many applications, thus reducing the level of engine disassembly required for pump replacement. To check and adjust the timing on these applications it will be necessary to remove the camshaft cover in order to gain access to the camshafts, sprocket and gears.

4.2. Checking the valve timing.

4.2.1. To check the engine timing is correct, the appropriate 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. A Crankshaft Turning Tool is supplied in the kit to turn the engine to insert the Flywheel Locking Pin fully.

4.2.2. Flywheel Locking Pin, VSE6121.01 (N47/N57) or VSE6121.05 (B37/B47)

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.

4.2.3. Crankshaft Turning Tool. VSE6121.02

The engine can only be turned at the crankshaft pulley.

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

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

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

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.



fig.2

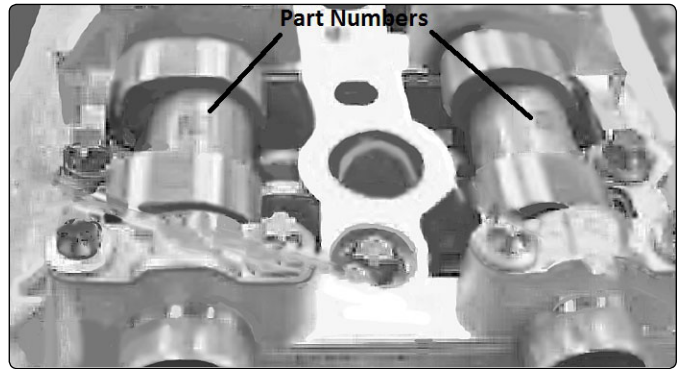


fig.3

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

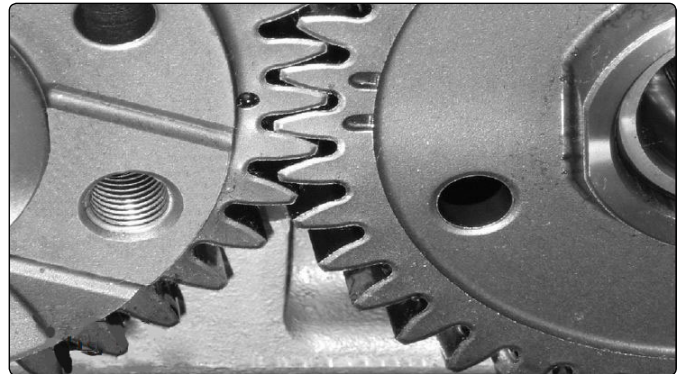


fig.4

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

4.2.7. 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)

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

4.3. Adjusting the valve timing.

Note: In order to adjust the timing the exhaust camshaft must be removed.

4.3.1. Follow the procedure for checking the valve timing.

4.3.2. Release the camshaft bearing cap bolts working from the

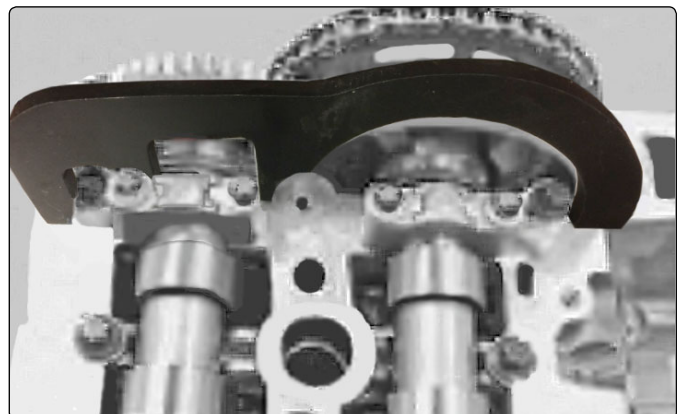


fig.5

- outside, inwards, and place all parts on a clean tray in identifiable order.
- 4.3.3. Release the chain tensioner and remove the exhaust camshaft by pulling upwards.
 - 4.3.4. Remove the camshaft sprocket bolts and detach the sprocket/chain.
 - 4.3.5. Position the inlet camshaft/gear as shown in fig 6, noting the installation position of the roller cam follower.
 - 4.3.6. Fit the exhaust camshaft/gear making sure that the timing marks on the gears align correctly (fig.5).
 - 4.3.7. 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.
 - 4.3.8. 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. (fig.6)
 - 4.3.9. Tighten the bolts to 10Nm.
 - 4.3.10. Slacken the 3 retaining bolts approx. 1/4 turn thus allowing the sprocket to turn, but not tilt, during chain tensioning.
 - 4.3.11. Install the chain tensioner.
 - 4.3.12. 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.5).
 - 4.3.13. Tighten the inlet camshaft sprocket retaining bolts.
 - 4.3.14. 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.



fig.6

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

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



fig.7

4.4. **HP Fuel Pump Removal/Installation – General Guide.**

The HP Pump Sprocket Retaining Tool is used to retain the position of the pump sprocket during removal of the HP pump on N47/N57 engines, thus maintaining the chain assembly and engine timing in place and reducing the level of engine disassembly required.

4.4.1. **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 "Checking the valve timing").

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

Note: 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.

Remove the sealing plug from the engine to access the HP pump sprocket bolt (fig.7)

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.

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

Remove the HP pump support.

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.

4.4.2. **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

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

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 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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