FB2874

DIESEL ENGINE SETTING/LOCKING KIT - BMW/ MINI N47/N57 1.6, 2.0, 3.0 - CHAIN DRIVE

Introduction:

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

Item	Description	OEM
A	Flywheel Locking Pin	11.5.320
B	Crankshaft Turning Tool	11.6.480
C	Camshaft Setting Plate	11.8.760
D	HP Pump Sprocket Retaining Tool	11.8.740

Application:

Model:

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), 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)

Mini: Clubman (10-14), Clubvan (12-14), Countryman (10-14), Mini (10-14), Paceman (13-14), Roadster (12-14)

Engine Code:

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

N57: D30O0, D30O1, D30T0, D30U0

Instruction:

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 **FB2874-01** 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.

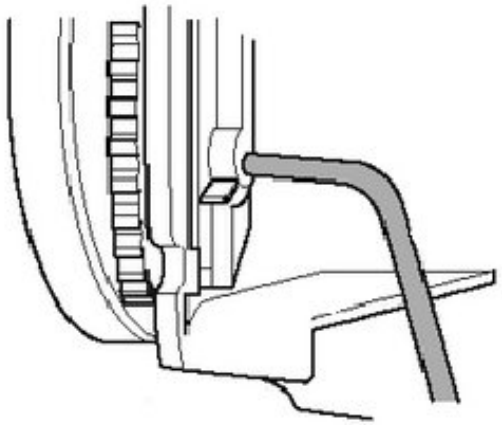
1. Checking Timing

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 fully insert the Flywheel Locking Pin.

1-2 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



1-3 Crankshaft Turning Tool

The engine can only be turned at the crankshaft pulley. Fit (B) 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.

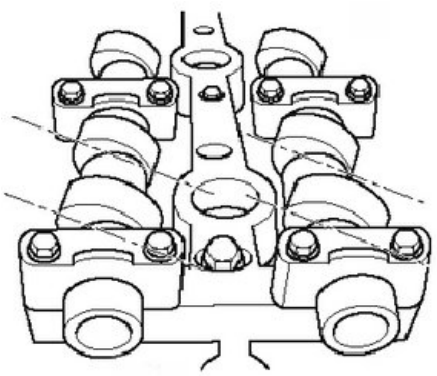
Fig.2

1-4 Slowly turn the engine to TDC No.1 cylinder, and fully insert the flywheel locking pin to locate the timing hole in the flywheel.

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.

Fig.3



1-6 The timing marks on the camshaft gears must be aligned. (Fig.4)

Fig.4

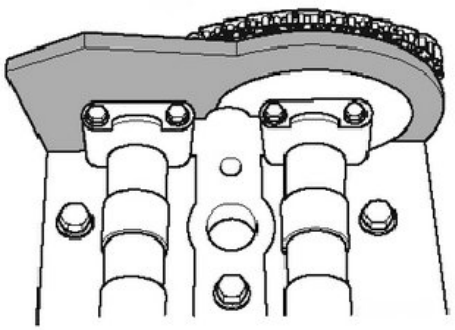
1-7 Camshaft Setting Plate

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

For the camshaft timing to be correct, the (C) 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.

Fig.5



2. Adjusting Timing

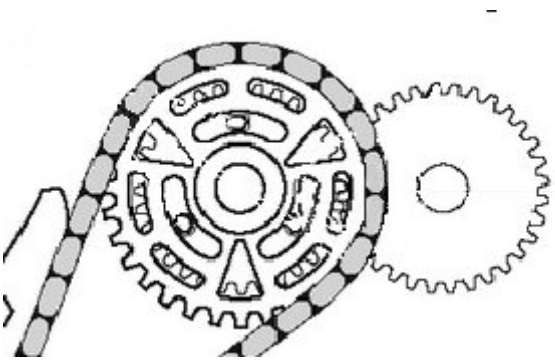
2-1 In order to adjust the timing the exhaust camshaft must be removed.

Lock the crankshaft at TDC No.1 cylinder by using (A) to 'lock' the flywheel (refer to **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.

2-2 Remove the camshaft sprocket bolts and detach the sprocket/chain. (Fig.6)

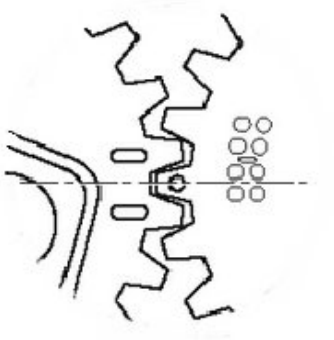
Fig.6



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)

Fig.7



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.

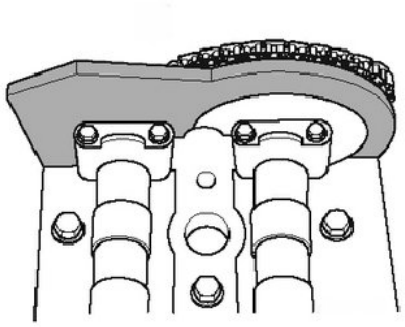
2-5 Place the camshaft sprocket with the timing chain onto the inlet camshaft, screw in the 3 retaining bolts ensuring they are located in the center of the elongated slots. Tighten the bolts to 10 Nm.

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.

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)

Fig.8



2-8 Tighten the inlet camshaft sprocket retaining bolts.

2-9 Remove the Flywheel Locking Pin and Camshaft Setting Plate and turn the engine over, by hand, two complete turns, using the (B). 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.

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.

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

3. HP Pump Removal/Installation – General Guide 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.

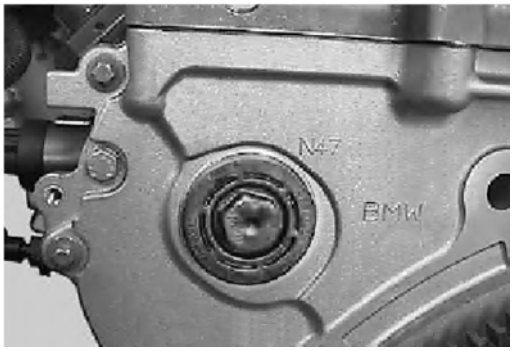
3-1 Removal

Using (B), turn the engine to TDC No.1 cylinder and 'lock' the crankshaft using (A) (as described in **1.** "**Checking Timing**").

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.

3-2 Remove the sealing plug from the engine to access the HP pump sprocket bolt. (Fig.9)

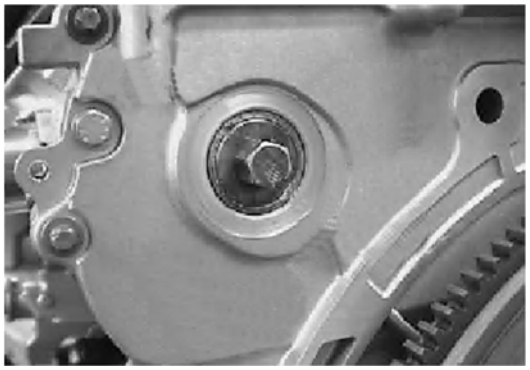
Fig.9



3-3 Screw in (D) 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

Fig.10



3-4 Remove the HP pump support.

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 center bolt.

NOTE: It will remain in place during the application.

3-6 Installation

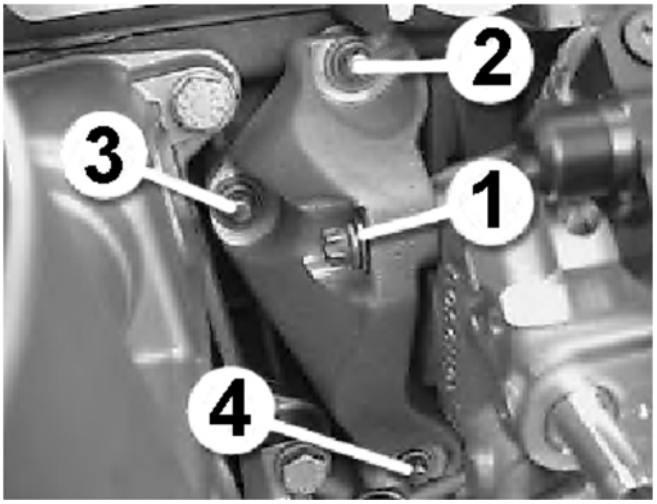
To insert the HP pump shaft into the sprocket it may be necessary to turn the pump through a number of degrees and rotate it back into its mounting position. A new pump will probably require the shaft to be turned to align the keyway position

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

3-7 Fit the retaining screw and mounting bolt and install the support bracket.

3-8 The support bracket screws should firstly be tightened, by hand, in the sequence 1-2-3-4 to fully fit the support bracket. They are then tightened to 19Nm. in the sequence 2-3-4-1. (Fig.11)

Fig.11



3-9 Remove the (D) and fit the sealing plug. Remove the Flywheel Locking Pin.

3-10 Reassemble all lines etc., vent the fuel system and reset the electric pump signal. Check for leaks. (BMW diagnostics may be required).