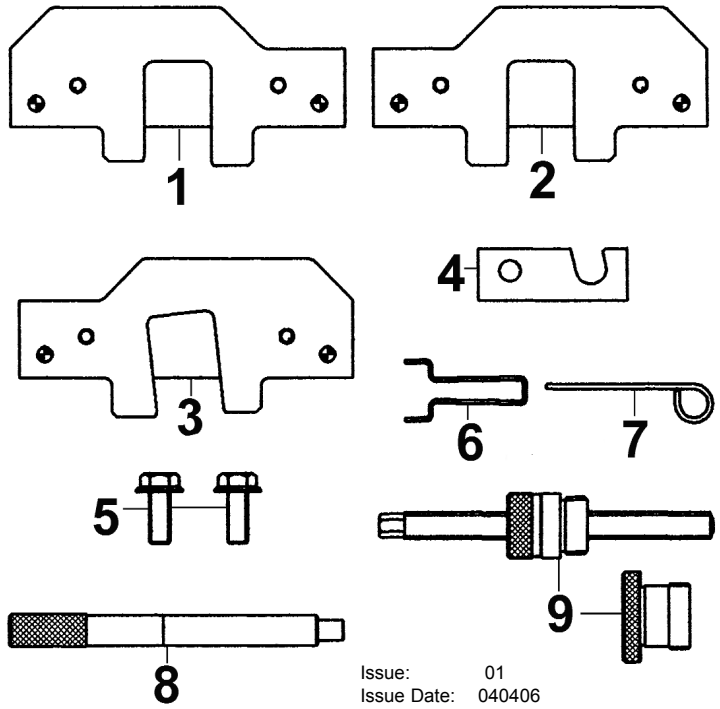
SEALEY Professional TOOLS
AUTO SERVICE LINE

Parts for:

BMW TWIN CAM TIMING KIT
Model No: VS4425



Issue: 01
Issue Date: 040406

Item.	Part No.	Description.
1	VS4310.01	LEFT HAND PLATE ASSEMBLY
2	VS4310.02	RIGHT HAND PLATE ASSEMBLY
3	VS4424	TIMING ADJUSTMENT PLATE
4	VS4309.04	LATCH PLATE
5	VS4309.05	LATCH BOLT
6	VS4311.01	TENSIONER PIN (M50)
7	VS4311.02	TENSIONER PIN (M52)
8	VS118/02	FLYWHEEL LOCKING PIN
9	VS4323	PRE-LOAD TOOL
--	VS4425.84	CASE AND INSERT (NOT SHOWN)

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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SEALEY Professional TOOLS AUTO SERVICE LINE

Sole UK Distributor
Sealey Group,
Bury St. Edmunds, Suffolk.

01284 757500
01284 703534

www.sealey.co.uk
sales@sealey.co.uk

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Instructions for:

BMW TWIN CAM TIMING KIT
Model No: VS4425

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 AND 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. PLEASE KEEP INSTRUCTIONS SAFE FOR FUTURE USE.**

1. SAFETY INSTRUCTIONS

❒ **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.

✗ **DO NOT** attempt to start engine or move vehicle whilst in gear with locking devices fitted.

✓ Always display warning notification on steering wheel when locking engine components.

✓ Account for all tools, locking bolts, pins and parts being used and do not leave them in or near the engine.

❒ **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.*

2. INTRODUCTION & APPLICATIONS

2.1 Introduction

The VS4425 Kit covers engine timing position on the complete range of M42, M44, M50, M52 BMW engines via a twin camshaft Setting Plate and an additional Timing Adjustment Plate (for M44 engines). It also includes the Flywheel Timing Pin, plus Chain Tensioner and Tensioner Pre-load tools required for engine timing and cylinder head / valve train applications.

VANOS (Variable Valve Control System) requires additional tools. The Single Vanos system (on inlet camshaft) requires the use of VS4312 Engagement Wrench. Double Vanos systems require a number of specialised tools.

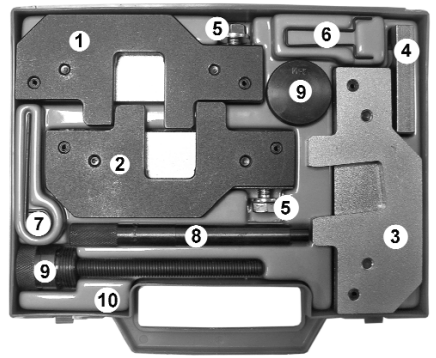
2.2 Applications:

BMW 4 cyl. & 6 cyl. Twin Camshaft M42, M44, M50, M52 engines in:-

318iS/Coupe, 318Ti Compact - E30/E36
Engine Codes: 18 4S 1, 19 4S 1 Non-Vanos (89-01)
320I, 325I, 24v - E36
Engine Codes: 20 6S 2, 20 6S 3, 25 6S 1, 25 6S 2, 25 6S 3 Non-Vanos and Vanos (91-97)
323i/Compact, 328I - E36
Engine Codes: 25 6S 3, 28 6S 1 Vanos (95-01)
520I, 525I 24v - E34
Engine Codes: 20 6S 2, 25 6S 1, 25 6S 2 Non-Vanos and Vanos (89-96)
520I, 523I, 528I - E39
Engine Codes: 20 6S 3, 25 6S 3, 28 6S 1 Vanos (95-00)
728I - E38
Engine Code: 28 6S 1 Vanos (95-98)
Z3
Engine Codes: 19 4S 1, 28 6S 1 (95-99)

3. CONTENTS

1	VS4310.01	Left Hand Plate Assembly
2	VS4310.02	Right Hand Plate Assembly
3	VS4424	Timing Adjustment Plate
4	VS4309.04	Latch Plate
5	VS4309.05	Latch Bolts (x2)
6	VS4311.01	Tensioner Pin (M50)
7	VS4311.02	Tensioner Pin (M52)
8	VS118/02	Flywheel Locking Pin
9	VS4323	Pre-Load Tool
10	VS4425.84	Case and Insert



4. INSTRUCTIONS

4.1 VS118/02 Crankshaft TDC - Flywheel Locking Pin (Fig.1)
VS118/02 Pin is used to 'lock' the crankshaft/flywheel at TDC. A timing hole is provided in the left-hand corner of the cylinder block. These timing holes can become corroded/constricted and may require cleaning out to enable the Flywheel Pin to be inserted.

4.2 Twin Camshaft Setting/Locking Plate (Fig.2)
Camshaft position - with the crankshaft 'locked' at TDC with Pin VS118/02, the timing arrows on the camshaft sprockets should be pointing vertically upwards. The front cam lobes on both camshafts should face towards each other. The sides of the square flanges at the back of the camshafts must be exactly at right angles to the top surface of the cylinder head and, the side with the drilled hole should be uppermost.
The accuracy of this camshaft position is determined by placing the Twin Plate Assembly over the square flanges. The plate **MUST FIT EXACTLY** over the flanges and **REST FULLY** on the surface of the cylinder head.
(Note: on M50 engines, remove the cover studs to allow a flat surface for the plate).
IMPORTANT: Use a suitable spanner (machine away the spanner sides to avoid any damage to the engine casing), on the hexagons/flats provided, (eg. between cams 5 & 6 on M42), to turn camshafts, or to counter-hold to remove sprocket bolts. **DO NOT USE SETTING PLATE TO COUNTER-HOLD CAMSHAFTS.**
WARNING: If either of the chain tensioners or timing chains are removed, the camshafts MUST NOT be turned or piston to valve contact will be made resulting in engine damage. Remove the crankshaft and camshaft locking tools and turn crankshaft 30° clockwise away from TDC position before camshafts are turned.

4.3 VS4424 Inlet Cam Timing Adjustment Plate E36/M44 Engines
VS4310 Cam Setting Plate Assembly is normally used to establish camshaft valve timing position on these BMW engines. However, to overcome certain instances of engine vibration at idle, caused by differing levels of residual gases in the engine cylinders, BMW introduced a procedure where the valve timing of the inlet cam can be retarded by 6° (12° crankshaft) to 116° crank angle. Special Cam Timing Adjustment Plate VS4424 (with 'gold' face plate) is required to achieve this revised setting. The normal Right-Hand Inlet Plate ('black' face plate VS4310.02) of VS4310 Cam Setting Plate Assembly is removed and VS4424 Plate is fitted in its place for these applications.

4.4 VS4311 Secondary Chain Tensioners (Fig.3)
Removal of the secondary timing chain/cam sprockets requires removal of the primary chain tensioner.
WARNING: The primary chain tensioner has a strong spring and care must be taken when unscrewing the tensioner. The VS4311 pins are used to lock down the secondary timing chain tensioner. Press down the tensioner pad and insert the appropriate pin to hold position. (Use VS4311.01 for M50 and VS4311.02 for M52).

Fig.1

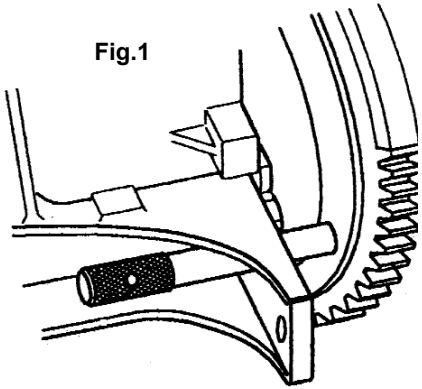


Fig.2

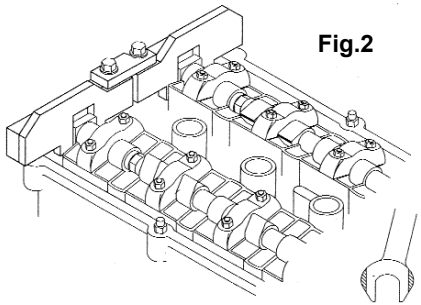
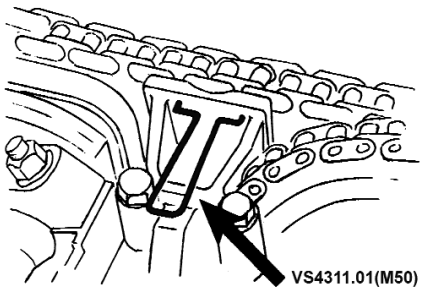


Fig.3



4.5 Final Engine Timing Check
Having adhered to the vehicle manufacturer's procedures to set the engine timing, it is essential to make a final check by carefully positioning the engine at TDC and refitting all the timing tools to establish that they locate correctly and confirm the engine timing position.

VANOS variable valve timing system - single VANOS unit mounted onto Inlet Camshaft.

4.6 VS4323 Primary Timing Chain Pre-Load Tool (Fig. 4) - M50/M52 VANOS engines
On M50/M52 VANOS engines - VS4323 Pre-load Tool must be used to achieve final position of the primary exhaust sprocket.
VS4323 Pre-load Tool comprises 3 parts - two Adaptors (1 marked for M50 and 1 marked for M52 engines), which screw into the hole from where the chain tensioner was removed, and an Adjustment Screw which screws into the Adaptor and applies the required pressure onto the tensioner rail.
When fitting the primary chain exhaust sprocket on engines with the VANOS system, or, after re-fitting a VANOS Unit, the primary timing chain tensioner is removed and the appropriate Adaptor from VS4323 Pre-load Tool is fitted into the hole. The Adjusting Screw is then screwed into the Adaptor and turned until it touches the tension rail.
The primary chain exhaust sprocket will move anti-clockwise so that the tapped holes in the camshaft flange become centred in the elongated holes of the sprocket.
Use a torque wrench to apply 1.3Nm. to the VS4323 adjusting screw.
Tighten camshaft sprocket bolts to specified torque.
IMPORTANT: Always ensure the timing chains are pre-loaded when checking position of the camshafts.

4.7 VS4312 VANOS Unit Engagement Wrench (Figs.5 & 6)
(Associated Tool - not included in Kit)
VS4312 Wrench is used when removing or re-fitting the Single VANOS Adjustment Unit with plate springs.
VS4312 is attached to the exhaust camshaft sprocket to turn the sprocket and secondary timing chain for removal of the VANOS Unit.
When re-fitting, the Wrench assists turning the sprocket in a controlled manner, anti-clockwise, until the VANOS spline shaft engages the internal splines of the inlet sprocket.

Fig.4

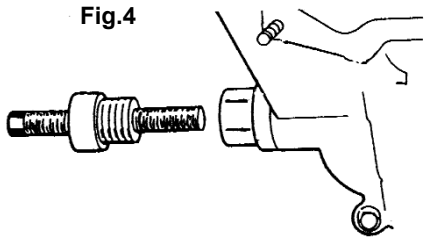


Fig.5

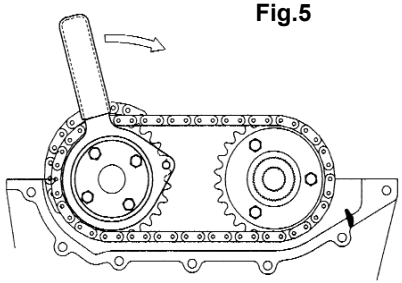


Fig.6

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www.sealey.co.uk
sales@sealey.co.uk