

# INSTRUCTIONS FOR: VS1409

## PETROL ENGINE TWIN CAM SETTING/LOCKING TOOL KIT FOR ALFA ROMEO 1.4/1.6/1.8/2.0 TWIN SPARK

### PARTS LIST

Item	Part No.	Description
1	VS1409/01	Camshaft Setting Plate Set (Bronze, numbered 4547/1 & /2)
2	VS1409/02	Camshaft Setting Plate Set (Silver, numbered 4548/1 & /2)
3	VS1409/03	Tensioner Adjuster, Balancer Shaft Belt
4	VS1403/04	Tensioner Adjuster, Timing Belt
5	VS1409/84	Case & Insert

### 1. INTRODUCTION & APPLICATIONS

#### 1.1. INTRODUCTION

VS1409 Setting/Locking Tool Kit covers a range of Twin Spark engines and includes the special Camshaft Setting Plates which are fixed in place of the camshaft bearing caps to accurately position the twin camshafts in their correct timed positions.

In addition the kit includes Tensioner Adjusters for both the timing belt and balancer shaft belt.

Note: TDC position on these Alfa Romeo engines is established using VS1404 TDC Positioning Tool - an associated tool, not included in kit. VS1404 requires a suitable Dial Test Indicator, such as AK9634M.

#### 1.2. APPLICATIONS

##### Alfa Romeo VS1409 Setting/Locking Tool Kit

**Models:** 145/146 (96-01), 155/156 (96-01) 1.4 16v. & 1.6 16v.  
**Engine Codes:** 676.01 (up to Spares Code 0084340) & 335.03  
**Use VS1409/02 and VS1403/04**

**Models:** 145/146 (96-01), 155/156 (96-06), Spider/GTV (98-01) 1.8 16v.  
**Engine Codes:** 322.01, 322.05 & 671.06  
**Use VS1409/02 and VS1403/04**

**Models:** 145/146 (96-01), 147 (01-07), 155/156 (95-02), 166 (98-01), Spider/GTV (96-03) 2.0 16v. **Engine Codes:** 162.01, 323.01, 323.10, 341.03 & 672.04

**Use VS1409/01, VS1403/04 and VS1409/03**

### 2. SAFETY INSTRUCTIONS

**WARNING!** Ensure that Health and Safety, local authority and general workshop practice regulations are adhered to.

DO NOT use tools if damaged.

Maintain tools in good and clean condition for best and safest performance.

If raised, ensure that vehicle to be worked on is adequately supported with axle stands or ramps and chocks.

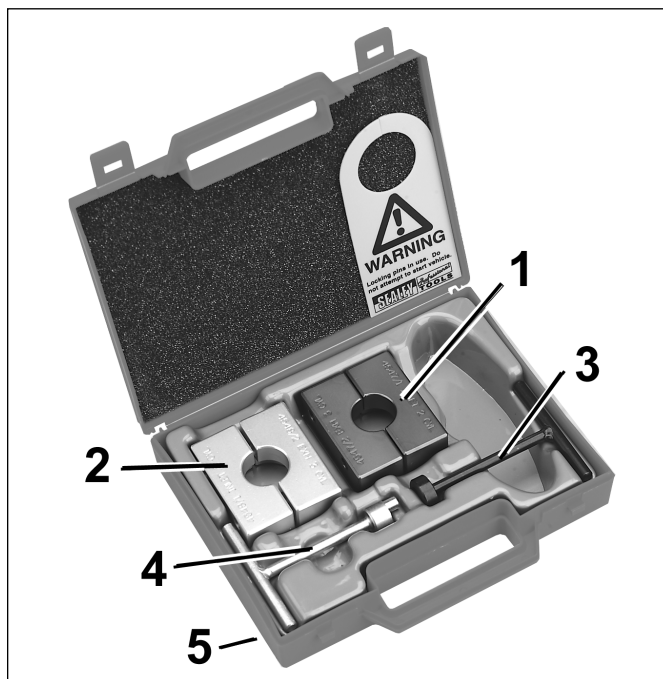
Wear approved eye protection. A full range of personal safety equipment is available from your Sealey dealer.

Wear suitable clothing to avoid snagging. Do not wear jewellery and tie back long hair.

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

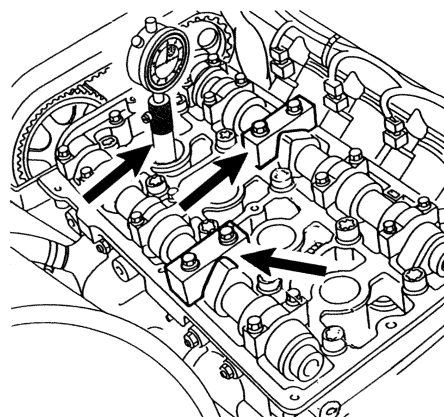
**WARNING!** DO NOT use Camshaft Setting Plates to hold the camshafts in position whilst releasing or re-tightening the sprocket bolts. Plates are for retention of timing position only.

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



#### 1.3. ASSOCIATED ESSENTIAL TOOL

**TDC Position Tool VS1404**  
(use with Dial Gauge AK9634M)



### 3. INSTRUCTIONS FOR USE

❑ **WARNING!** Ensure you read, understand and apply Section 2 Safety Instructions before commencing.

#### 3.1. Setting and Locking 1.4, 1.6, 1.8 & 2.0 Twin Spark Engines

Timing belt replacement on these Alfa Romeo twin cam engines is carried out with the crankshaft at TDC, established by using VS1404 TDC Position Tool (fig. 1) to determine the piston position in No1 cylinder. The camshafts are retained in the 'timed' positions by the use of special Camshaft Setting Plates, VS1409/01 or VS1409/02, fixed in place of designated bearing caps (fig. 2).

Both camshaft sprockets are released and free to turn on the camshafts.

Marks on the new timing belt are aligned with marks on the sprockets/pulley and fitted in the following order: crank, guide, exhaust camshaft, inlet camshaft, tensioner, water pump.

Initially the timing belt tensioner is adjusted to maximum using Tensioner Adjuster VS1403/04.

The camshaft sprockets are then tightened, all setting/locking tools removed and the camshaft bearing caps re-fitted. The engine is rotated by hand two revolutions and VS1404 re-fitted to ensure return to TDC.

The timing belt tensioner is adjusted so that the pointer aligns with the hole (see Section 3.3), the engine again rotated two revolutions and returned to TDC. All timing marks must align.

For 2.0 engines the balancer shaft belt is tensioned using VS1409/03 Adjuster. With the crankshaft at TDC, align the balancer shaft timing marks and fit the belt. Adjust tensioner to position as detailed in Section 3.4.

It is good practice to confirm that the engine timing is correct by adjusting to TDC using VS1404 and then re-fitting the camshaft setting plates to check the timing positions.

#### 3.2. VS1409/01 & VS1409/02 Camshaft Setting Plate Sets

On Alfa Romeo Twin Spark engines the twin camshafts are retained in the 'timed' positions by Camshaft Setting Plates which are bolted in position in place of designated bearing caps on both inlet and exhaust camshafts. Each Setting Plate is machined to provide the exact profile and 'timed' position of the cam at the designated bearing location.

**Inlet camshaft setting plate must replace the bearing cap of No.2 cylinder, see fig. 2.**

**Exhaust camshaft setting plate must replace the bearing cap of No.3 cylinder, see fig. 2.**

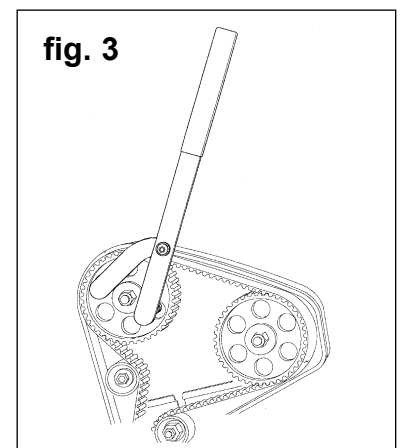
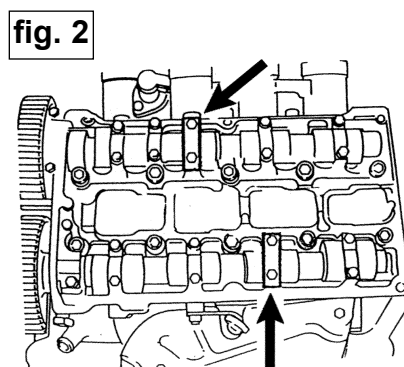
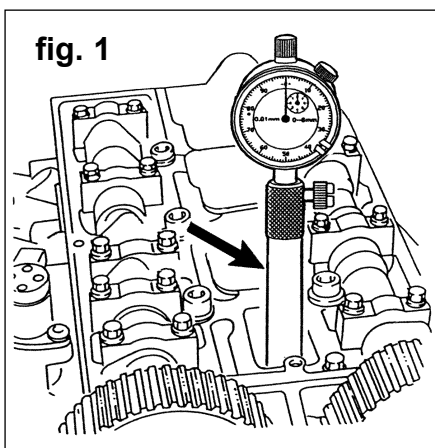
**Important!** Care **must be** taken when fitting Camshaft Setting Plates to ensure that:

- the correct set of plates is being used for the engine being worked on - plates are numbered and colour coded - see the parts list.
- the correct plate is used on each camshaft - plates are clearly marked 'Inlet' and 'Exh'.
- each plate is fitted in place of the bearing cap of the designated cylinder only - plates are marked '2 Cyl' or '3 Cyl' as appropriate.
- fixing holes in the plates match the off-set bearing cap holes and the plate exactly matches the cam profile.

When removing camshaft bearing caps, clearly mark which is 'inlet' and which is 'exhaust' and keep them clean at all times.

When installing Camshaft Setting Plates and subsequently re-fitting the bearing caps, always tighten bolts to the specified torque.

**Important!** **DO NOT** use the Camshaft Setting Plates to hold the camshafts in position whilst releasing or tightening the sprocket bolts. Plates are for retention of timing position only. Use a suitable tool to counter-hold sprockets (fig. 3), taking care not to damage any position sensors located behind them.

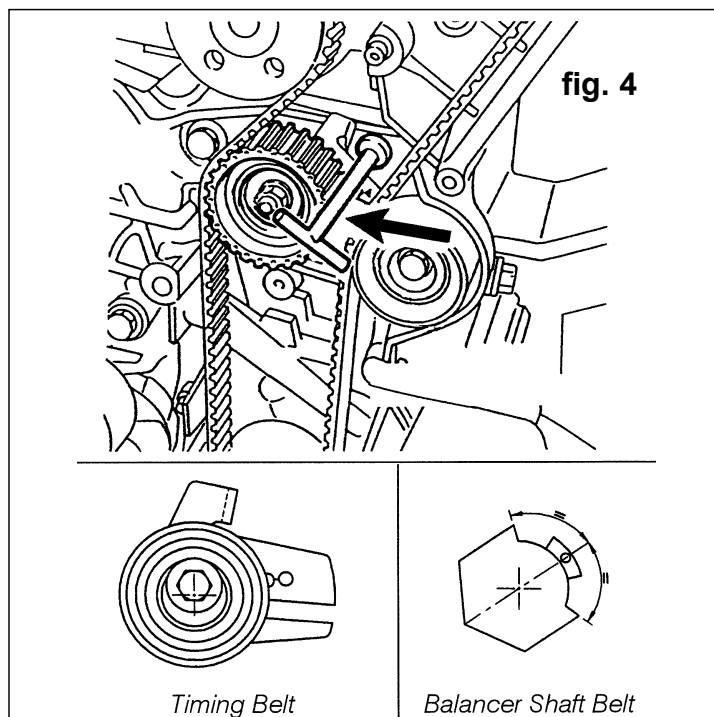


### 3.3. VS1403/04 Tensioner Adjuster, Timing Belt

VS1403/04 is used for all these twin cam engines. The correct final position for the timing belt tensioner is with the pointer of the tensioner aligned with the reference hole, see fig. 4.

### 3.4. VS1409/03 Tensioner Adjuster, Balancer Shaft Belt

VS1409/03 adjusts the tension of the balancer shaft belt on 2.0 engines. The correct final position for the tensioner is with the hole on the tensioner aligned to the centre point of the tensioner movement, see fig. 4.



### 3.5. VS1404 TDC Position Tool (associated tool - not in kit)

The correct engine/crank TDC position is established using VS1404 together with a suitable DTI such as AK9634M Dial Gauge, as shown in fig. 1. VS1404 indicates when the the piston of No. 1 cylinder is at its highest point (TDC).

**Note: This must be on the ignition stroke (i.e. both inlet and exhaust valves of No. 1 cylinder closed).**

Remove the spark plugs and install the DTI into VS1404 and secure with the thumbscrew.

Screw VS1404 fully into the centre spark plug hole of No. 1 cylinder, taking care not to overtighten.

By turning the crankshaft in the normal direction of engine rotation, the piston will raise the indicator pin of VS1404 and in turn move the needle of the DTI.

TDC is achieved when the DTI needle reaches its highest reading and starts to move in the reverse direction.

Check that all timing marks align.

**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 product.

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

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