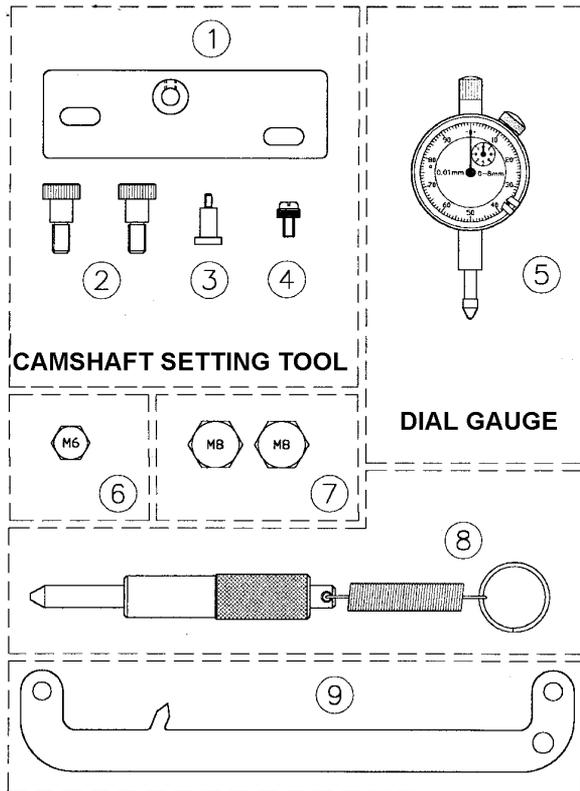


DIESEL ENGINE SETTING/LOCKING TOOL KIT FOR VAUXHALL/OPEL



PARTS LIST		
1	VS114B/01	Cam Setting Plate
2	VS114B/02	Shoulder Lock Screws (2)
3	VS114B/03	DTI Foot
4	VS114B/04	Thumbscrew
5	AK9634M	Dial Gauge
6	VS103/1	M6 Locking Bolt (1)
7	VS102/3	M8 Locking Bolts (2)
8	VS117/02	Locking Pin
9	VS117/01	Flywheel TDC Setting Tool

INTRODUCTION

The VS114 Setting and Locking Tool Kit covers a wide range of GM diesel engines, from the 1.5TD in the Corsa to the 3.1TD in the Monterey. The kit includes the Camshaft Setting Plate and DTI for the 1.6 and 1.7D engines, the Flywheel Setting Tool for 1.7DTL (-97) and the superseding Locking Pin for 97-models, plus Locking Bolts. A comprehensive selection of tools for service work/belt replacement on Vauxhall/Opel vehicles.

NOTE: Pre '87 model year 16D/17D engines require VS105 Locking Plate, not included in this kit but available separately. See details at end of this data.

1. APPLICATION

1.1. APPLICATION

Vauxhall/Opel: Fitted with 1.6DA, 1.7D/DR/DTL (Opel). 1.5D/TD, X1.7DT, 1.7D/DT, 2.0TD, 2.2D, 2.3D, 2.4TD, 2.5D/TD, 3.1 Turbo D (Isuzu) engines.

1.2. USE PRODUCT WITH THE FOLLOWING COMPONENTS

Camshaft Alignment/Locking Tool AssemblyVS1065.
Flywheel Holding ToolVS1280.

1.3. ASSOCIATED TOOLS & APPLICATIONS

Camshaft Locking Plate & Screw (pre '87 models)VS105.
Bosch Rotary Diesel Injection Pump Timing Tool - M8/M10/M12 Service Ports .VS1079
CAV. Rotodiesel Injection Pump Timing ToolVS110
Water Pump/Camshaft Belt AdjustersVS092, VS093.

2. APPLICATION DETAILS

VAUXHALL/OPEL

Tools used from kit

Nova 1.5TD, Corsa-B 1.5D/TD	
Corsavan/Combo 1.7D, Astra-F 1.7TD, Cavalier 1.7TD (17D/DT. 4EE1 engines)	VS102/3 + VS103/1
Vectra 1.7TD (X17DT engine)	
Astra 1.6/1.7D, Astravan 1.6/1.7D, Astramax 1.6/1.7D, Cavalier 1.6/1.7D, Vectra 1.7D	VS106A + AK9634M + VS1065 (optional)
(16DA, 17D engines 86-96)	
Note: Pre '87 model year engines use VS105 Camshaft Locking Plate	
This is an optional tool not included in this kit.	
Astra-F 1.7D/TD, Astravan 1.7D, Cavalier 1.7D (17DR/X17DTL engines 93-)	VS106A + AK9634M + VS117/01 (-97) or
	VS117/02 (97-). VS1065 (optional)
Frontera 2.8TD, Monterey 3.1 Turbo D, Midi 2.0/2.4TD, 2.2D	
Brava 2.3D, 2.5D/TD, 3.1TD	VS102/3

3. SAFETY INSTRUCTIONS

- ❑ **WARNING!** Ensure all health and safety, local authority and general workshop practice regulations are strictly adhered to when using tools.
- ✗ DO NOT use tools if damaged.
- ✓ Maintain the tool in good and clean condition for best and safest performance.
- ✓ If required ensure the vehicle to be worked on is adequately supported with axle stands, 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!** Incorrect or out of phase camshaft timing can result in contact between the valve head and the piston crown causing possible damage to the engine. Incorrect injection pump timing may cause excessive smoke emissions, poor starting and low power output.

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

4. INSTRUCTIONS FOR USE

❑ **WARNING!** Ensure you have read and understood chapter 3 safety instructions before commencing.

Note: 'TDC' refers to top dead centre on the compression/injection stroke (inlet and exhaust valves both closed).

4.1. VS106A Camshaft Setting/Locking Tool.

Used with AK9634M Dial Test Indicator. For camshaft setting/locking - vehicles from '87 onward, see applications.

NOTE: VS106A is used in conjunction with optional Alignment Tool VS1065.

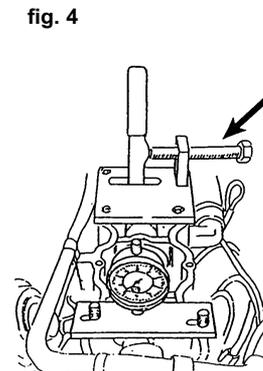
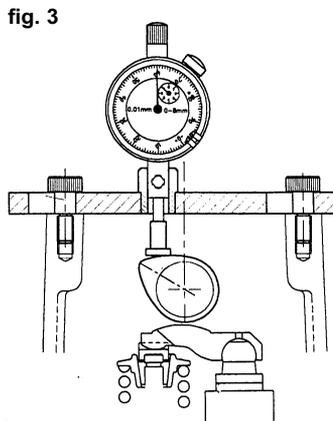
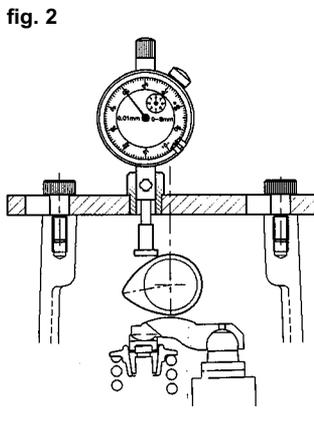
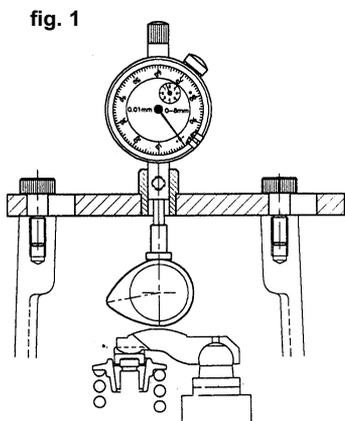
4.1.1. Checking Timing

1. Turn crankshaft in the normal engine direction of rotation to 90 degrees before TDC (No.1 cylinder).
2. Insert DTI into Setting Plate VS114B/01. **IMPORTANT: DTI must be held securely by Thumbscrew VS114B/04 in VS114B/01 plate.**
3. Unscrew plunger end off the DTI gauge AK9634M and screw in its place DTI Foot VS114B/03. Ensure the foot threads fully up to its shoulder into the DTI.
4. Locate Shoulder Screws VS114B/02 through setting plate body into camshaft housing holes at No.1 cylinder, over 2nd cam. Push plate to rest against the right stop so that the DTI foot rests over the base of cam, fig.1. Release thumbscrew and pre-load the indicator gauge **TO NOT MORE than 0.5mm**. Secure DTI firmly in the plate with thumbscrew. **Set the DTI gauge to zero (datum point)**. Push plate to rest against the left stop so that indicator foot rests over cam lobe, fig.2.
5. Turn crankshaft in the normal engine direction to TDC No.1 cylinder, fig.3. Read off the value on the dial test indicator, nominal value: 0.55 +/- 0.03mm. If nominal value is not obtained timing must be adjusted.

4.1.2. Adjusting Timing.

1. Ensure timing belt tension is correct.
2. Turn crankshaft in the normal engine direction to TDC No.1 cylinder.
3. Locate spanner on camshaft hexagon and restrain while loosening fastening bolt of camshaft pulley.
4. Break the taper between camshaft and pulley.
5. Remove crankcase vent hose and fit Alignment Tool VS1065 (optional, not in kit) over No.4 cylinder, secure with three M6x1.0P screws, fig.4.
6. Insert DTI AK9634M with 10mm dia. Foot VS114B/03 into Setting Plate VS114B/01. Locate Shoulder Screws VS114B/02 through setting plate body into camshaft housing holes at No.1 cylinder, over 2nd cam.
7. Push plate to rest against right stop so that DTI foot rests over base of cam, fig.1.
8. Turn camshaft in opposite direction to normal rotation until the DTI foot rests on the base diameter of the cam, with the cam lobe in position as fig.1.
9. Pre-load the indicator **TO NOT MORE than 0.50mm**, and set gauge to zero (datum point).
10. Push plate to rest against left stop so that DTI rests over the cam lobe, fig.2. Dial gauge will now read below the zero datum point.
11. Turn camshaft carefully, with the spanner of VS1065, in the normal engine direction until the DTI returns to zero datum point and then continue to turn until a reading of approx 0.80mm is achieved.
12. Fine adjust with the adjusting bolt on VS1065 to give an indicator reading of 0.60mm-0.64mm, fig.4.
13. Leave VS1065 in place whilst fitting new fastening bolt to lock camshaft pulley to camshaft (never refit old bolt), tighten to specified torque.
14. Remove VS1065 and VS106A. Rotate crankshaft and return to alignment of all TDC marks. Repeat "Check Timing" procedure to ensure 0.55 +/- 0.03mm nominal value is achieved.

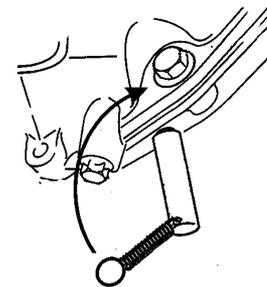
IMPORTANT: Check diesel fuel injection pump timing using VS1079 or VS110 Pump Timing Tool according to the injection pump fitted.



4.2. VS117/02 Flywheel Locking Pin (X17DTL Engine 97-) - See applications.

VS117/02 is used in place of VS117/01 Setting Tool on the latest engines having a two-part oil pan. The VS117/02 Locking Pin is inserted through a hole in the gearbox bell housing and locks the flywheel/crankshaft at No.1 cylinder TDC position.

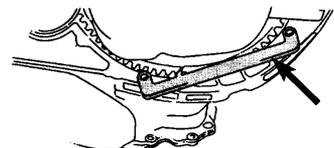
The crankshaft is carefully turned via the bolt of the timing belt pulley gear in the normal direction of engine rotation, until VS117/02 can be located in the flywheel. VS117/02 Pin is supplied with a retaining spring. This is attached to a nearby bolt to retain the pin in its hole during work on the engine.



IMPORTANT: DO NOT use VS117/02 for locking the flywheel for the purpose of counter holding when removing the vibration damper/drive gear. It is for retention of timing position only.

4.3. VS117/01 Flywheel TDC Setting Tool (X17DTL engine -97) see applications.

When removing/installing timing belt and establishing or checking correct timing position, the VS117/01 Setting Tool is essential to determine the flywheel/crankshaft TDC position. It is attached to the flywheel housing and provides the "pointer" position on which to align the TDC mark.



4.3.1. Removal

Remove auxiliary belts, timing belt cover, camshaft cover and clutch cover and turn crankshaft in normal direction to align timing marks. Align marks on injection pump and attach VS117/01 to flywheel housing. Align pointer with TDC mark on flywheel to establish flywheel/crankshaft timing position. Engine is set to "Ign, TDC No.1 Cylinder". Slacken tensioner to left hand stop and remove belt.

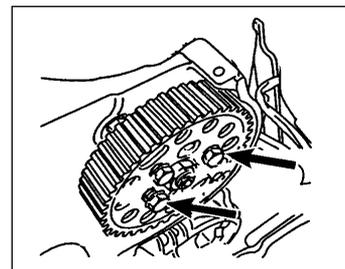
4.3.2. Installation

Check TDC marks are aligned on injection pump and flywheel. Install timing belt, and apply tensioner. Turn engine clockwise two revolutions and realign all timing marks. Adjust tensioner clockwise to "V" for new belt, and L.H. edge of "V" for used belt. Turn engine to achieve 90 degrees BTDC at No.1 cylinder and fit Camshaft Setting Tool VS106A. Use Dial Test Indicator AK9634M to establish camshaft setting. Refer to VS106A instructions given earlier.

4.4. VS103/1 and VS102/3 Locking Bolts. - Multi vehicle use. (see applications).

These are used as an alternative to locking pins for positioning the camshaft and injection pump sprockets in the TDC position. Follow service manual instructions to remove engine timing covers where necessary.

1. Set engine to the correct point of timing using the engine timing marks (refer to workshop manual).
2. Screw the locking bolts into position, the engine is now locked and the timing belt can be removed without disturbing the engine timing.

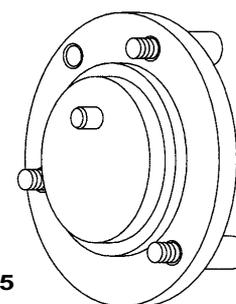


4.5. VS105 Camshaft Locking Plate and Screws 1.6D/1.7D Engines Astra/Cavalier (pre 87)

Optional Tool - not included in kit.

VS105 Locking Plate bolts onto the camshaft housing, in place of the vacuum pump, and carries a peg to locate in a hole at the end of the camshaft to lock it in the TDC position.

1. Align the crankshaft and injection pump timing marks.
2. Remove the vacuum pump from the camshaft carrier and offer VS105 in place of the vacuum pump.
3. If the tool locates with the peg entering the camshaft hole, the valve timing is correct and the camshaft is locked in position. Secure in place with 3 locking screws provided.
4. If the tool will not align correctly refer to the service manual instructions and correctly adjust the camshaft timing.



VS105

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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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