

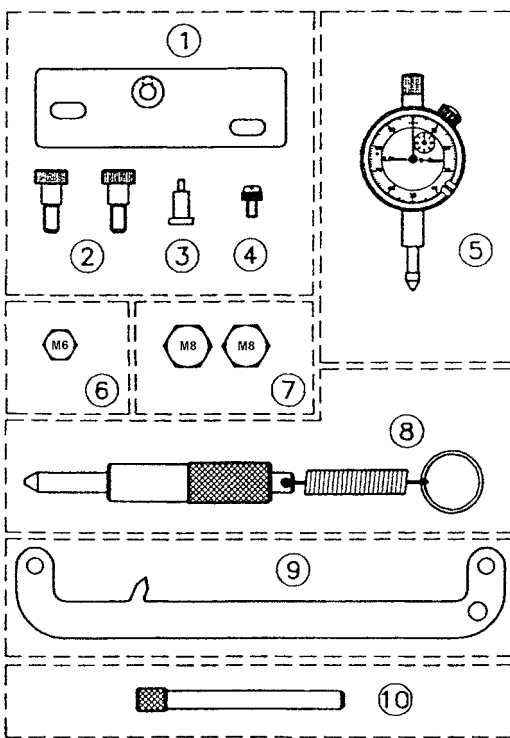
### INSTRUCTIONS FOR: DIESEL ENGINE SETTING/LOCKING SET- VAUXHALL/OPEL - 1.6, 1.7D/TURBO - BELT DRIVE MODEL No: VS1141

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. INTRODUCTION & CONTENTS

Updated kit covers later X17DTL variants and includes camshaft setting plate and dial gauge for the 1.6 and 1.7D engines, flywheel setting tool for the 1.7DTL (to 97) and locking pins for vehicles 1997 onwards.



Contents			OEM Number
Item	Part Number	Description	Vauxhall/Opel
1	VS1148/01	Cam /Setting Plate	KM-661-1
2	VS1148/02	Shoulder Lock Screws (*2 per kit)	KM-661-1
3	VS1148/05	DTI Special Foot	KM-661-1
4	VS1148/04	Thumbscrew	KM-661-1
5	AK9634M	Dial Gauge	(M)KM-571-A
6	VS103/1	M6 Locking Bolt	
7	VS102/3	M8 Locking Bolts (*2 per kit)	
8	VS117/02	Flywheel Locking Pin	KM-951
9	VS117/01	Flywheel TDC Setting Tool	KM-851
10	VS120/1	Injection Pump Locking Pin	KM-6011

This information table provides the Vehicle Manufacturer's Specialised Tool references and the Sealey tool numbers covering the relevant service application.  
\*These spares are sold as individual tools - not as pairs or multiples.

## 2. APPLICATION CHART

### Vehicle Applications:

Make:	Model:	Year:
Vauxhall/Opel	Astra- E	(86-91)
	Astra- F	(91-98)
	Astra-G	(98-00)
	Astramax	(86-93)
	Ascona-C/Cavalier	(89-95)
	Vectra-A	(89-95)

### Engines:

1.6D	1.7D
16DA	17D
16DR	17DR
	X17DT
	X17DTL

### 3. SAFETY INSTRUCTIONS

- ❑ **WARNING!** Ensure all Health and Safety, local authority and general workshop practice regulations are strictly adhered to when using tools.
- X **DO NOT** use tools if damaged.
- ✓ Maintain tools in good and clean condition for best and safest performance.
- ✓ If required, ensure that the 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 any 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 possibly causing 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 a proprietary manual, to establish the current procedure and data. These instructions are provided as a guide only.

### 4. INSTRUCTIONS

- ❑ **WARNING!** Ensure you have read and understood Section 3 safety instructions before commencing.  
**Note:** 'TDC' refers to top dead centre on the compression/injection stroke (inlet and exhaust valves both closed).  
**Vauxhall/Opel Diesel Engines 16DA / 17D / 17DR / 17DTL**

The tools provided in VS1141 Kit cover setting and locking of the camshaft, crankshaft/flywheel and injection pump.  
To establish correct camshaft timing position, VS106A is used with Dial Test Indicator AK9634M. The kit includes VS114B/03 Special Foot which must be screwed into the dial test indicator plunger, in place of its normal 'domed' end.

On earlier 1.6 and 1.7D engines, injection pump and crank TDC timing marks are provided. However to establish TDC on X17DTL engines up to 1996, VS117/01 TDC Setting Tool is required and from 97 on, VS117/02 Flywheel Locking Pin is used in place of VS117/01. On X17DTL engines from 98MY VS120/1 Locking Pin is required to fix the injection pump timing position. All these tools are included in Kit VS1141.

**Note:** Additional Tool VS1065 Camshaft Locking Tool Assembly (fig. 4) is used for timing adjustment and timing belt replacement procedures. VS1065 is not included in kit.

**WARNING:** These timing tools must NOT be used to counter-hold the crank/flywheel for removing/releasing pulleys or sprockets. They are for retention of engine timing position only. Use appropriate Holding Tool.

#### 4.1. VS106A Camshaft Setting Plate Assembly

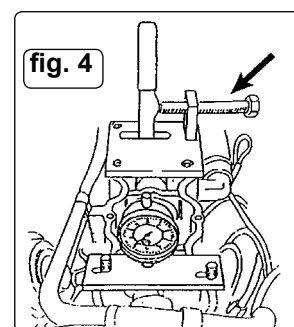
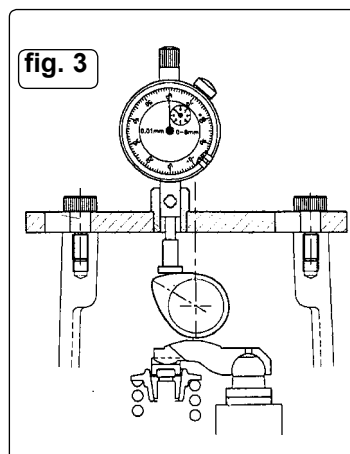
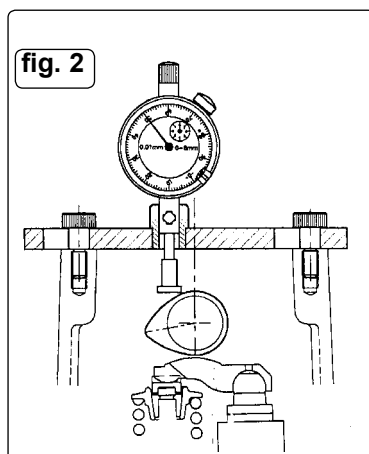
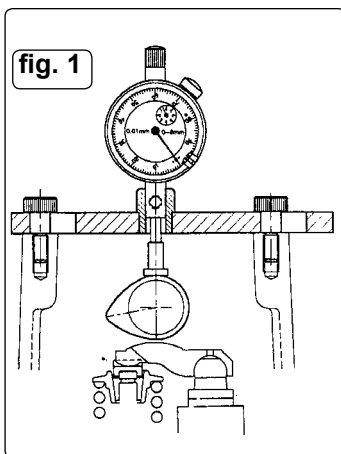
##### 4.1.1. Checking Timing

**Note:** The following action is for checking the timing position only. Timing belt replacement requires set-up/adjustment of the engine timing - see 4.1.2. Adjusting Timing.

**IMPORTANT:** Carry out timing belt tensioning procedure as per vehicle manufacturer's instructions. Belt tension must be correct.

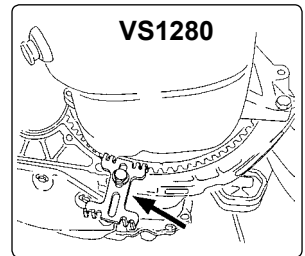
1. Turn crankshaft in the normal engine direction of rotation to 90 degrees before TDC (1st cylinder).
2. Insert and fix Dial Test Indicator AK9634M into VS114B/01 Setting Plate. DTI shaft must be held securely in plate. Initially retain the DTI shaft by lightly pinching with thumbscrew.
3. Unscrew plunger end from the DTI gauge and screw in its place DTI Special Foot VS114B/03. Ensure that the foot threads fully up to its shoulders into the DTI.
4. Fix VS114B/01 Plate into the camshaft housing holes, by using the two VS114B/02 Shoulder Lock Screws, at 1st cylinder inlet valve (over 2nd cam lobe from front).
5. Push plate to the right to rest against the right stop position. The DTI Special Foot should rest on the base circle of cam, fig. 1. Release thumbscrew and pre-load the indicator to not more than 0.50mm. Re-secure the DTI firmly in the plate with thumbscrew. Set the DTI gauge to zero (datum point).
6. Push the plate to the left to rest against the left stop position so that the indicator rests over the cam lobe, fig. 2.  
**Note:** The dial test indicator will now read below the datum point.
7. Turn crankshaft in the normal engine direction to TDC ensuring all timing marks align. Use VS117/01 TDC Setting Tool or VS117/02 TDC Locking Pin as appropriate to engine. Lock injection pump using VS120/1 on X17DTL engines 1998 on.
8. The cam lobe will rise, fig. 3 and the DTI will return to the zero datum point and continue to the correct nominal value of 0.55 +/- 0.03mm.

**WARNING:** If the nominal value is not obtained, cam timing must be adjusted.



#### 4.1.2. Adjusting Timing and Timing Belt Replacement

1. Remove the crankshaft pulley - use VS1280 Flywheel Holding Tool to counter-hold whilst releasing the pulley bolt, if appropriate to engine - see Application Chart.
2. Lock the engine to its timed position using TDC and injection pump locking tools. Slacken tensioner and remove belt.
3. Fit new belt and ensure timing belt tension is correct. Remove all locking tools.
4. Carefully turn the engine in the normal direction of rotation to 90 degrees before TDC.
5. Locate a spanner on the camshaft hexagon and restrain whilst loosening fastening bolt of the camshaft sprocket. On engines 98MY on also slacken injection pump sprocket bolts.
6. Install VS114B/01 Camshaft Setting Plate and AK9634M DTI and Special Foot exactly in the same way as detailed for 'Checking Timing' procedure. With the plate in its right stop position the special foot rests on the base circle of the camshaft. Pre-load and set the DTI gauge to zero as in 'Checking Timing' procedure.
7. Push setting plate to its left hand stop. Carefully turn the crankshaft to its TDC position and check that all timing marks align, or that VS117/02 Locking Pin can be inserted.
8. On 98MY+ engines carefully turn the injection pump sprocket clockwise to allow VS120/1 Pin to be inserted.
9. Remove crankcase vent hose and fit Camshaft Locking Tool VS1065 over the 4th cylinder and secure with the three M6 screws provided, fig. 4.
10. VS114B/01 Plate remains pushed to the left in its left stop position with the dial test indicator resting on the cam lobe, fig. 3. Turn the camshaft carefully, with the spanner of VS1065, in the normal engine direction until the dial test indicator reads approximately 0.80mm.
11. Screw in the adjusting bolt of VS1065 until it rests against the spanner, then fine adjust with the adjusting bolt to turn the camshaft in the opposite direction to normal rotation until dial test indicator gives a reading of 0.60 - 0.64mm.
12. Remove VS114B/01 ensuring that the DTI position within the plate is not altered.
13. Leave VS1065 in place to lock the camshaft position whilst fitting new fastening bolt to camshaft sprocket (never refit old bolt) and tightening to the specified torque. Remove VS1065 and tighten injection pump sprocket bolts if appropriate.
14. Remove all tools, rotate crankshaft twice and return to TDC position.
15. Install VS114B/01 Plate in its left stop position with DTI resting on cam lobe to check that the correct timing nominal value of 0.55 +/- 0.03mm has been achieved.



#### 4.2. VS117/01 Flywheel TDC Setting Tool (X17DTL engines -96) - see Application Chart

VS117/01 Setting Tool is essential to determine the flywheel/crankshaft TDC position and is attached to the flywheel housing to provide the pointer position on which to align the TDC mark on the flywheel.

#### 4.3. VS117/02 Flywheel Locking Pin (X17DTL engines 97-) - see Application Chart

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 TDC position.

The crankshaft is carefully turned in the normal direction of engine rotation, until VS117/02 can be located into 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.

#### 4.4. VS120/1 Injection Pump Locking Pin (X17DTL engines 98-) - see Application Chart

From MY98 on, the injection pump sprocket provides a datum hole to establish pump timing. When renewing the timing belt, the pump sprocket retaining bolts are slackened and timing position established using VS120/1 Locking Pin.

#### 4.5. Isuzu Diesel Engines

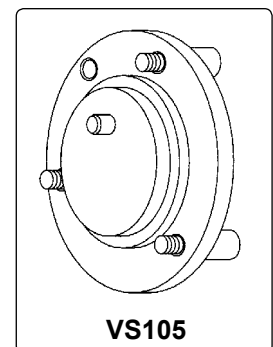
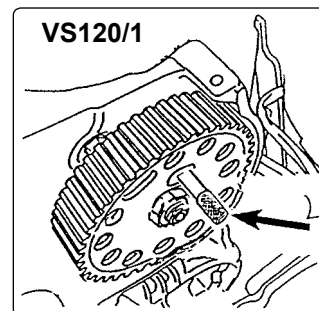
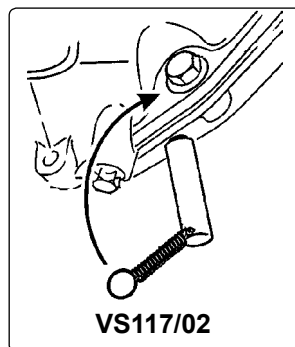
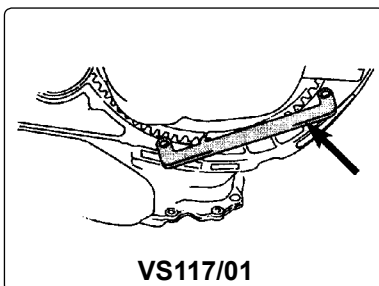
VS103/1 and VS102/3 Locking Bolts - see Application Chart

These are used as an alternative to locking pins for locking the camshaft and injection pump sprockets in the TDC position. These two sizes are widely used on Isuzu engines to lock the sprockets so that the timing belt can be replaced 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 Camshaft 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 the three locking screws provided.
4. If the tool will not align correctly refer to the service manual instructions and correctly adjust the camshaft timing.



**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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