

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 THIS 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.

1. SAFETY INSTRUCTIONS

- ✓ Maintain the tools in good and clean condition for best and safest performance.
 - ❑ **WARNING!** Ensure that all Health & Safety, local authority and general workshop practice regulations are strictly adhered to when using these tools.
 - ✗ **DO NOT** use tools if damaged.
 - ❑ **WARNING!** Incorrect or out of phase camshaft timing can result in contact between valve head and piston crown, possibly causing damage to the engine.
- IMPORTANT:** Always refer to the vehicle manufacturer's service instructions, or a proprietary manual, to establish the current procedures and data. These instructions are provided as a guide only.



VS4766

2. INTRODUCTION & APPLICATION

The Vauxhall/Opel 2.2 16v. Z22SE engine is chain drive - crankshaft to both inlet and exhaust camshafts. A separate chain connects the crankshaft to a balancer shaft and coolant pump. Special timing tools are required when carrying out service work on the cylinder head, front end timing cover, chains and tensioners. Removal of the crankshaft pulley requires VS4768 Holding Tool and additionally, replacement of the coolant pump is carried out using Special Retaining Tool VS4769 to retain position of its sprocket and maintain engine timing.

2.1 APPLICATIONS

2.1.1 VAUXHALL/OPEL 2.2 16v. Z22SE Engine (Chain drive)

Twin camshaft petrol engines in:

Astra	Vectra	Zafira
Signum	Speedster/VX220	



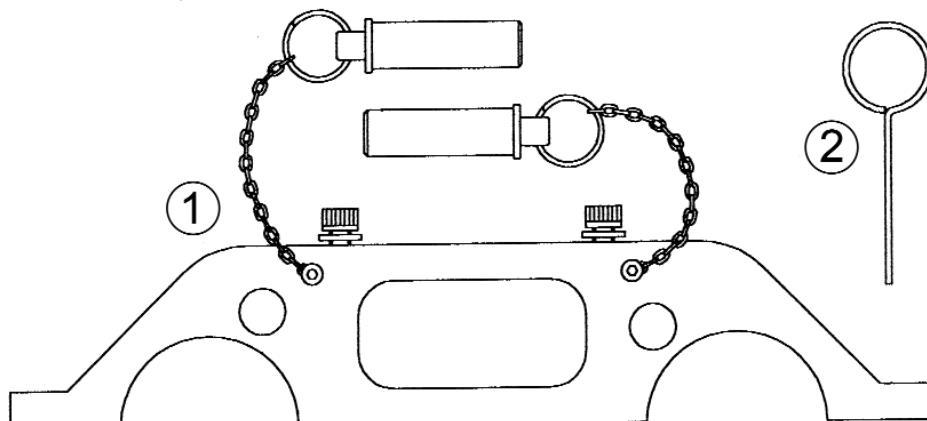
VS4768



VS4769

3. CONTENTS & ASSOCIATED TOOLS

ITEM	PART NO.	DESCRIPTION
	VS4766	COMPRISES:
01.	VS4767	CAMSHAFT SETTING TOOL
02.	VS4593/1B	TENSIONER RETAINING PIN
-	VS4768	CRANKSHAFT PULLEY HOLDING TOOL (ASSOCIATED TOOL)
-	VS4769	COOLANT PUMP SPROCKET RETAINER (ASSOCIATED TOOL)



4. OPERATING INSTRUCTIONS

4.1 TIMING CHECK

- 4.1.1 VS4767 Setting Tool is required to determine correct camshaft timing.
- 4.1.2 Remove air filter housing, intake pipe and engine vent hose.
- 4.1.3 Relieve fuel pressure and detach fuel line, evaporator and ignition module.
- 4.1.4 Detach wiring harness and coolant pipe in order to remove the cam covers.
- 4.1.5 Remove auxiliary belt and turn the crankshaft carefully, in the normal direction of engine rotation, to set the 4th cylinder at TDC.

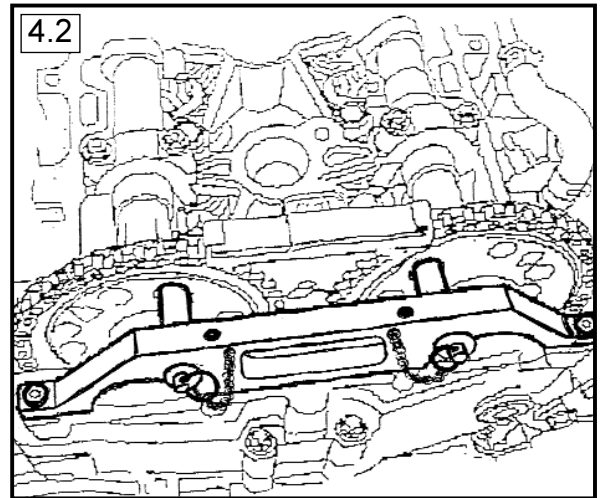
Note: The cam lobes on both camshafts over this cylinder should point upwards.

4.2 CAMSHAFT SETTING TOOL (VS4767)

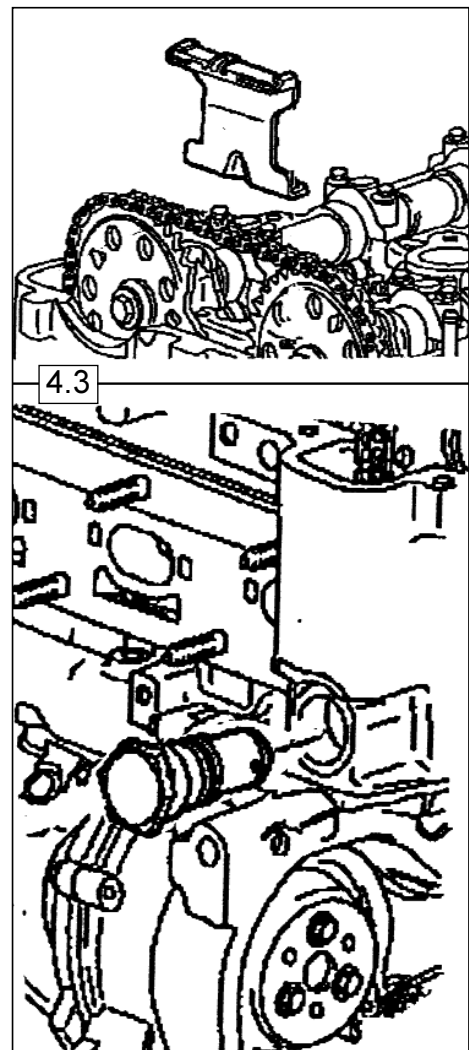
- 4.2.1 Fix VS4767 Camshaft Setting Tool in place using the two securing screws provided.
- 4.2.2 Insert both 'positioning pins' through the holes in the main body of the Tool and into the timing holes in the inlet and exhaust camshaft sprockets.
- 4.2.3 If the 'positioning pins' cannot enter the designated camshaft sprocket holes, timing will require adjustment.

4.3 TIMING ADJUSTMENT

- 4.3.1 When service work has required the dismantling/removal of chains, sprockets and tensioners, engine timing will need to be re-established. 'Timing adjustment' requires the same procedure.
- 4.3.2 Fix VS4767 Camshaft Setting Tool in place using the retaining screws provided.
- 4.3.3 Set the 4th cylinder at TDC (cam lobes should point upwards).



Upper Sliding Rail



Chain Tensioner

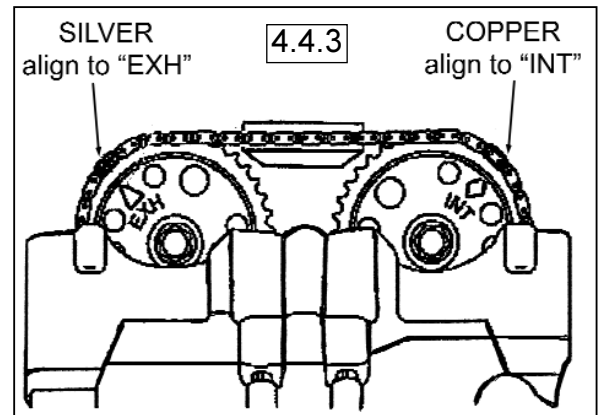
4.4 UPPER SLIDING RAIL - CHAIN TENSIONER

- 4.4.1 Remove the upper sliding rail and remove the chain tensioner from the timing chain.

Note: The tensioner should be of a type with marks on the hexagon. If not it is likely a new tensioner and rail will be required.

- 4.4.2 Remove the EXHAUST camshaft sprocket, counter-holding the camshaft via the hexagon section on the camshaft.

- 4.4.3 Adjust the position of the INLET camshaft sprocket, turning the camshaft via the hexagon section, until the 'positioning pin' of VS4767 can be inserted into the designated timing hole in the sprocket.
- 4.4.4 Position the timing chain on the sprocket so that the COPPER coloured link is located at the "INT" mark on the sprocket.
- 4.4.5 Position the SILVER coloured link onto the exhaust camshaft sprocket at the "EXH" mark, offer up the exhaust camshaft sprocket to the exhaust camshaft and turn the camshaft (at hexagon) until the sprocket can be fitted to the camshaft.
- 4.4.6 Ensure that the 'positioning pins' of VS4767 Setting Tool can be inserted in to the designated holes in both sprockets.
- 4.4.7 Withdraw the 'positioning pins' and tighten the exhaust sprocket bolt whilst counter-holding the camshaft at the hexagon section.
- 4.4.8 Replace seal rings of chain tensioner and pre-tension it by pulling out the piston, clamping it vertically upwards in a vice and locking the inner piston at last indent, by turning to the right.
- 4.4.9 Re-install piston in housing and install the tensioner in engine.
IMPORTANT: Ensure the tensioner is activated by pushing the tension rail or chain against it.
- 4.4.10 Turn the crankshaft twice returning the crankshaft to mark and the 4th cylinder to TDC.
- 4.4.11 Push the 'positioning pins' into the holes in the camshaft sprockets to check engine timing is correct.
- 4.4.12 Remove Tool and fit the upper sliding rail.

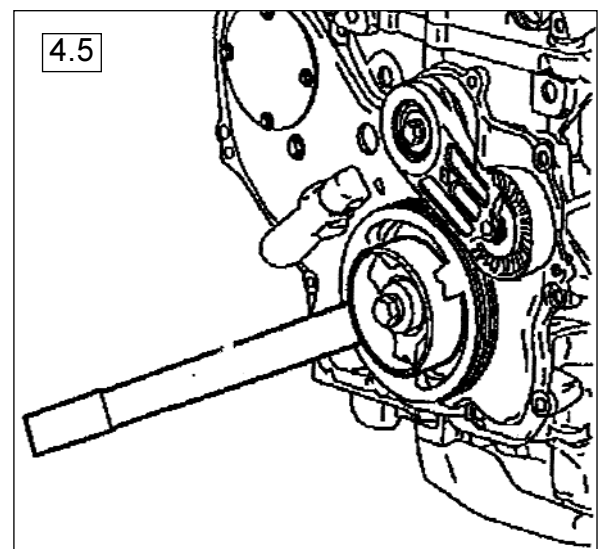


4.5 CRANKSHAFT PULLEY HOLDING TOOL

(VS4768 Associated Tool - not included in kit)

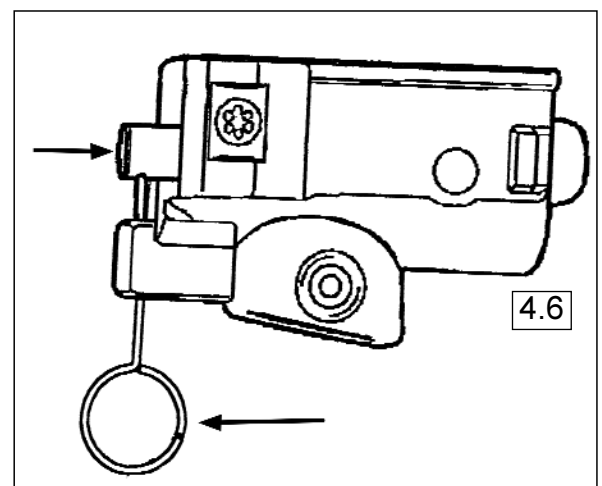
- 4.5.1 Any service work requiring removal of the front lower cover will require the crankshaft pulley to be removed.
- 4.5.2 As it will be necessary to remove engine mounting for these applications, the engine must be supported from below.
- 4.5.3 Use VS4768 Holding Tool to counter-hold the crank pulley whilst releasing and tightening the centre bolt.

Note: **DO NOT** attempt to counter-hold the crankshaft/engine using timing tools or in any other way.



4.6 BALANCER SHAFT TENSIONER

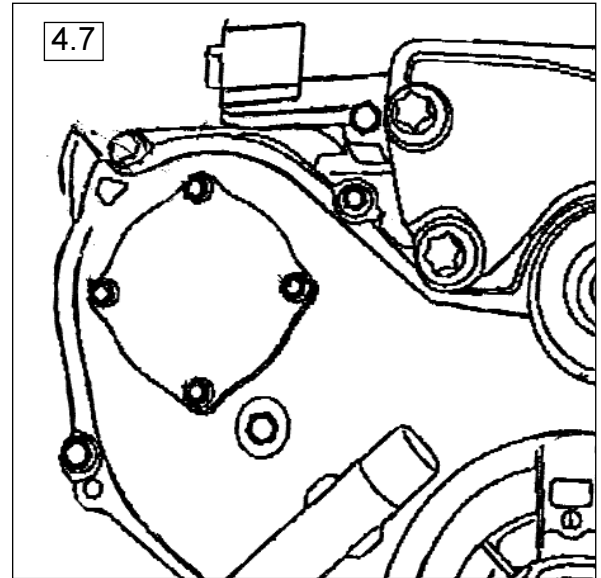
- 4.6.1 To remove the balancer shaft timing chain the tensioner must be removed.
- 4.6.2 Before re-fitting the tensioner, the plunger must be compressed into the body and retained.
- 4.6.3 Use Retaining Pin VS4593/1B by turning the tensioner plunger clockwise, to retract and insert Pin VS4593/1B to retain.
- 4.6.4 Remove the Pin to reactivate the tensioner once fitted.



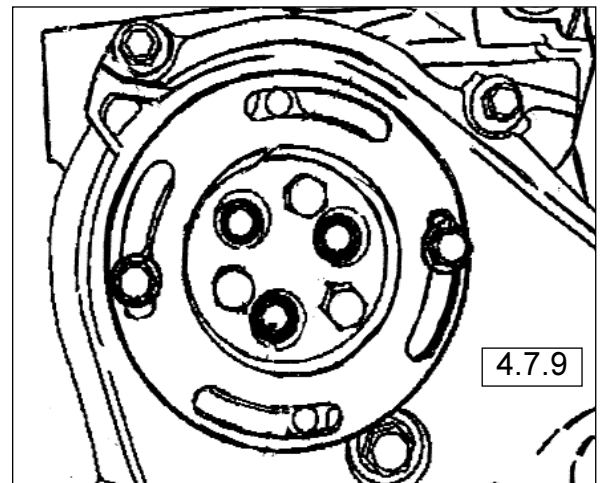
4.7 COOLANT PUMP REPLACEMENT

(VS4769 Associated Tool - not included in kit)

- 4.1 The coolant pump on the Z22SE engine can be replaced without the need to disassemble the front end, allowing the engine timing position to be maintained.
- 4.2 A service cover is provided on the front cover to allow Retainer VS4769 to be fitted to hold the coolant pump sprocket in position, whilst the coolant pump is removed/replaced.
- 4.3 Remove upper timing cover, manifold heat shield and oxygen sensor wiring harness plug.
- 4.4 Remove auxiliary belt and release pump drain bolt and drain coolant.
- 4.5 Disconnect wiring harness plug from coolant temp. sensor and detach coolant hose from thermostat housing and heater hose from radiator.
- 4.6 Remove thermostat housing and pull it, with pipe, out of coolant pump.
- 4.7 Close drain bolt and remove coolant pump cover.
- 4.8 Remove the pump front service cover (4 bolts).



- 4.9 Loosely attach VS4769 Retainer using two of the service cover bolts in the outer slotted holes of the Tool.
- 4.10 Using the 3 centre attaching bolts supplied with the Tool, secure VS4769 Retainer to the coolant pump sprocket.
- 4.11 Tighten the outer bolts to firmly fix the Tool in place. Release the 3 bolts which retain the coolant pump to the sprocket.
- 4.12 Remove coolant pump.
- 4.13 The engine timing is not disturbed as the chain is retained, in place, on the pump sprocket.
- 4.14 Replace pump, re-fit the bolts retaining the pump to its sprocket and remove VS4769 Retainer Tool.



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 equipment. **WARRANTY:** Guarantee is 12 months from purchase date, proof of which will be required for any claim. **INFORMATION:** For a copy of our latest catalogue and promotions call us on 01284 757525 and leave your full name and address, including postcode.



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