SEALEY Professional TOOLS
AUTO SERVICE LINE

VS1400.V2

PETROL ENGINE TWIN CAM SETTING/LOCKING KIT FOR FIAT & LANCIA 1.2/1.4 16v.

1. INTRODUCTION & APPLICATION

1.1. Introduction

Some of the 1.2 & 1.4 Fiat/Lancia engine timing is assessed with all four pistons in-line. This kit includes piston positioning, camshaft setting and crankshaft locking tools. Also includes cam belt tension adjuster. Supplied with warning tag, comprehensive instructions and carry-case.

1.2. Applications

FIAT 1.2 16v. & 1.4 16v. Twin Cam Petrol engines in;
FIAT
New 500, Panda, Punto, Grande Punto, Idea, Linea, Palio Weekend, New Bravo, Stilo, Brava/Bravo, Marea/Weekend.
LANCIA
Ypsilon, Musa.

1.2 16v. - 176 B9.000, 182 B2.000, 188 A5.000
1.4 16v. - 843A.1000, 169A3.000, 192B2.000, 198A1.000, 198A4.000, 199A6.000.

2. 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.
✓ 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 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.*

3. CONTENTS & ASSOCIATED TOOLS

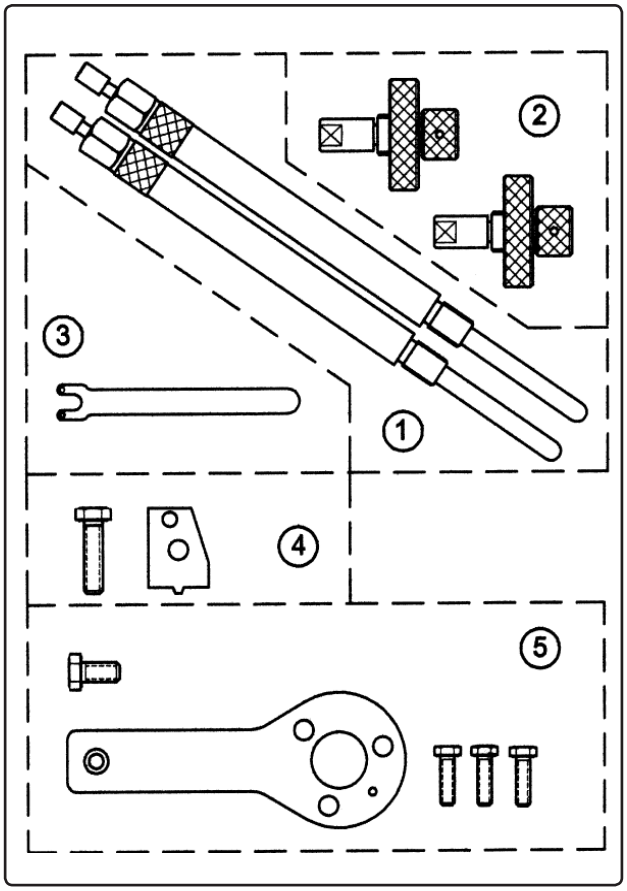
3.1. Contents

Kit contents/spares

Item	Part Number	Description
1.	VS1400/01	Piston Positioning Tool Set (Pair)
2.	VS1400/02	Camshaft Setting Tool Set (Pair)
3.	VS1400/03	Belt Tensioner Adjuster
4.	VS4911	Camshaft Sprocket Locking Tool
5.	VS4951	Crankshaft Locking Tool
--	VS4510A-84	Case + Insert

IMPORTANT: Always refer to the vehicle manufacturers service instructions, or proprietary manual, to establish the current procedures and data. Product Information Sets detail applications and use of the tools with any general instructions provided as a guide only.

Additional Tools required: VS173 Sprocket Holding Tool



4. INSTRUCTIONS

The Fiat 1.2 16v. engine was introduced in 1997 with the 1.4 16v. version released in 2003.
A number of engine variants now exist and timing belt replacement procedures, and timing tools used, differ across the range and are dependant upon the engine variant/engine code.
All the 1.2 16v. engines detailed below have the same procedure and use the same timing tools from Kit VS1400.V2.
For 1.4 16v. engines detailed – most have the same, or similar procedure but have different timing tool requirements. The tools are included in Kit VS1400.V2.
VS1400.V2 Kit covers all the engine variants/codes detailed.

Timing belt replacement.

Section 4.1: 1.2 16v. – 179B9.000, 182B2.000, 188A5.000 and 1.4 16v. 843A1.000

Section 4.2: 1.4 16v. – 192B2.000, 198A1.000, 198A4.000 and 199A6.000

Section 4.3: 1.4 16v. – 169A3.000

4.1 1.2 16v. - 179B9.000, 182B2.000, 188A5.000 1.4 16v. - 843A1.000

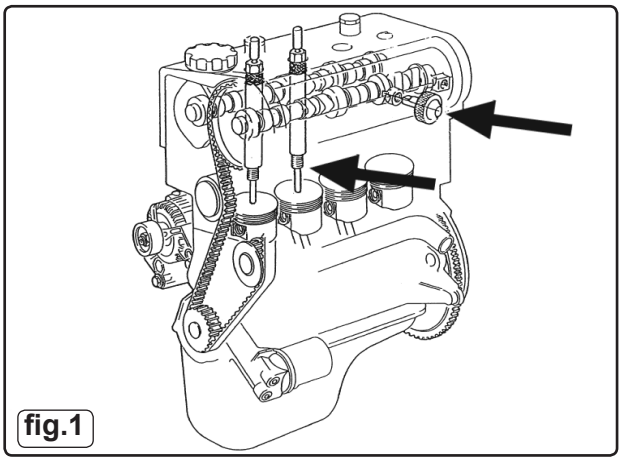


fig.1

General

On this group of 1.2 & 1.4 16v. engines, timing is checked, and belt replacement carried out, by positioning the height of all four pistons in line, by using VS1400/01 Piston Position Tools (Pair) in No.1 and No.2 cylinders. The camshafts are 'set' in position by VS1400/02 Camshaft Setting Tools (Pair), entering through the sides of the camshaft housing and locating into "timing slots" in the camshafts.
The camshaft sprocket must be released and free to turn on the camshaft when fitting a new belt. Belt fitting order as follows - Crankshaft Gear, Water Pump, Camshaft Sprocket, Tensioner. For the new belt, the tensioner is initially positioned at maximum using VS1400/03 Adjuster.
The camshaft sprocket bolt is then tightened and all setting/locking tools removed. The engine is turned by hand, two revolutions. The tensioner is adjusted so that its marks align. The engine is turned by hand again and the Piston Position and Camshaft Setting Tools refitted to check that the engine timing is correct.

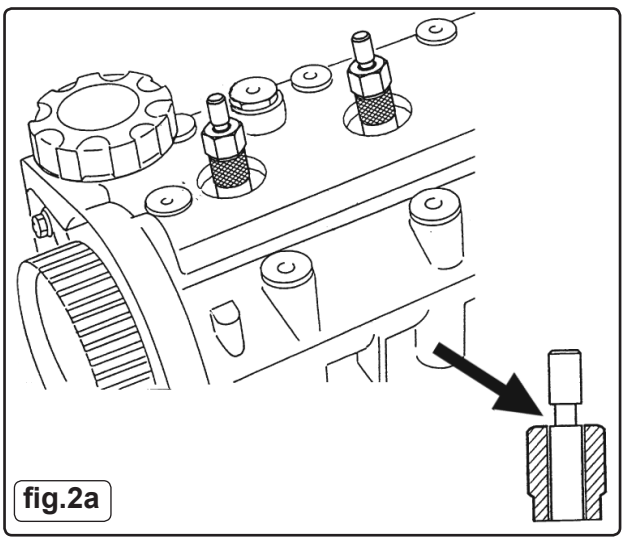


fig.2a

VS1400/01 Piston Position Tools

VS1400/01 Set comprises 2 x Positioning Tools which are used to establish the crankshaft/engine timing position, which is correct when all four pistons are in line with one another. VS1400/01 Main Bodies are screwed into the spark plug holes of No.1 and No.2 cylinders.

4.1.1 Remove spark plugs and screw the main body of each tool **fully** into the spark plug holes, taking care not to over-tighten. Carefully slide the Indicator Pins into the bodies to rest on top of the pistons, with grooves uppermost (on top).

4.1.2 The crankshaft must be turned slowly, in the direction of normal engine rotation, until the bottom of the grooves on the Indicator Pins are visually in line with the top of the Main Bodies. When both tools achieve this position, the pistons will be in line with one another, **ie. halfway through their stroke and No.1 cylinder piston MUST be descending (inlet stroke).**

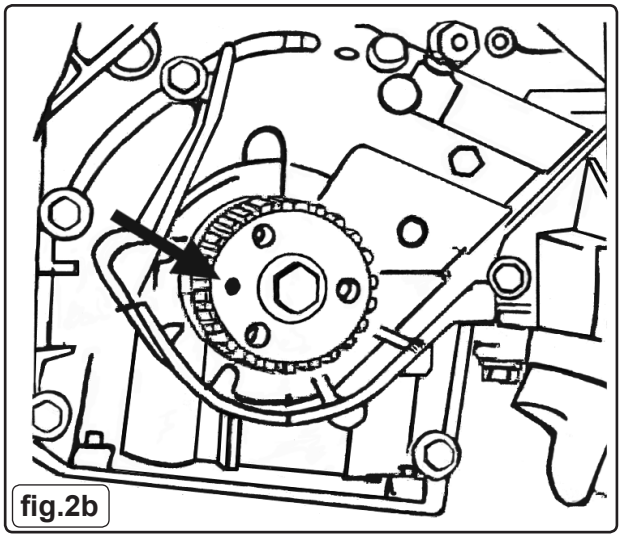


fig.2b

IMPORTANT: Check that the crankshaft is in correct timed position – the reference pin on the crankshaft gear must be positioned level with, **but on the opposite side to**, the RPM sensor. Check that camshaft "timing slots" are in line with the side entry holes in the camshaft housing (see VS1400/02).

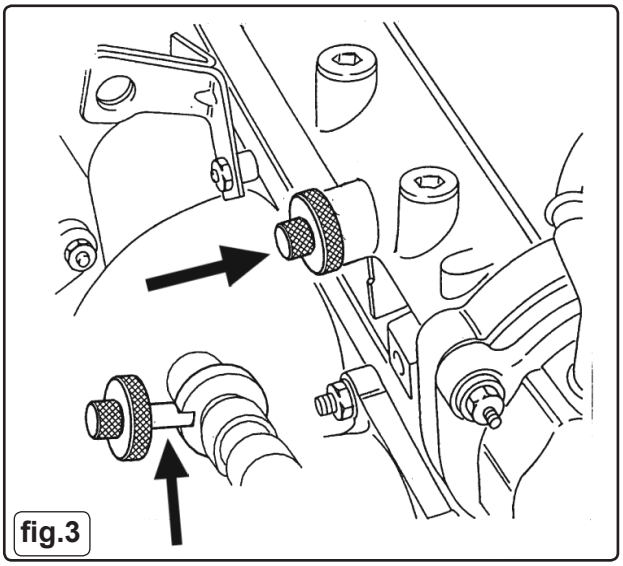


fig.3

VS1400/02 Camshaft Setting Tools (fig.3)

VS1400/02 Set comprises 2 x VS1400/02 Setting Tools which screw into the side entry holes situated on the sides of the camshaft housing.
Each camshaft has a 'timing slot' which, when positioned and retained in line with the 'timing hole', provides the correct timed position for the camshaft.

4.1.3 Remove the sealing plugs from the camshaft housing. Visually check that the camshaft 'timing slots' are in line with the entry hole and insert VS1400/02 Tools, holding the centre spindle steady whilst screwing in the main body of the tool.

4.1.4 Check that the crankshaft is in timed position, slacken tensioner bolt and remove the old timing belt.

4.1.5 Release and replace the camshaft sprocket bolt with a new bolt. Screw in the new bolt finger-tight allowing the sprocket to turn on the camshaft, but not tilt.
WARNING: DO NOT use VS1400/02 Setting Tools to counterhold when releasing/tightening camshaft sprocket. Use Holding Tool VS173 -Additional Tool – not included in Kit.

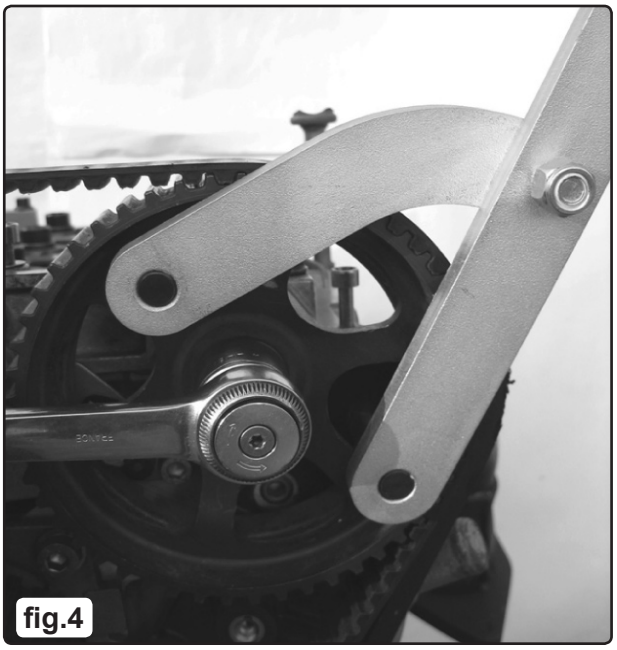


fig.4

VS173 Sprocket Holding Tool – Additional Tool not included in kit

4.1.6 Fit new timing belt.

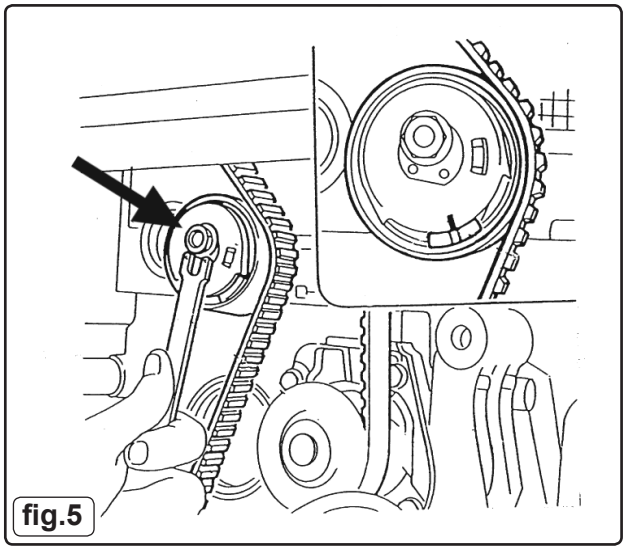


fig.5

VS1400/03 Tensioner Adjuster - Timing Belt
VS1400/03 is a special 'peg' wrench and locates into the two holes in the tensioner (fig.5), to carry out belt tension adjustment. After fitting a new belt the tensioner is initially set at maximum tension.

4.1.7 Fit a new camshaft sprocket bolt and counter-hold the camshaft sprocket whilst tightening the bolt.

4.1.8 Remove all timing tools.

4.1.9 Turn the engine over, by hand, returning to timed position. Using VS1400/03 adjust the belt tensioner so that the tensioner marks align.

4.1.10 Fit the Piston Position and Camshaft Setting Tools to check that the engine timing is correct.

4.2 1.4 16v. – 192B2.000, 198A1.000, 198A4.000 and 199A6.000 General
The timing belt replacement procedure is basically the same as described in Section 4.1, **EXCEPT** for engine codes **192B2.000** and **199A6.000**, Fiat instructions show that cylinders No.3 and No.4 are used for Tools VS1400/01 to establish crankshaft timed position.
The same timing tools as for 1.2 16v. (Section 4.1) are used on this group of engines, **PLUS an extra tool.**
For these engines, Fiat additionally introduced the requirement of locking the camshaft sprocket when removing and installing the sprocket bolt - A particular necessity when VVT (variable valve timing) is fitted, as there is no other means of counter-holding the camshaft sprocket when releasing the sprocket bolt during the belt replacement procedure. This additional tool is VS4911 Camshaft Locking Tool.

VS1400/01 Piston Position Tools

4.2.1 Fit VS1400/01 Piston Position Tools in appropriate cylinders.

4.2.2 The crankshaft must be turned slowly, in the direction of normal engine rotation, until the bottom of the grooves on the Indicator Pins are visually in line with the top of the Main Bodies. When both tools achieve this position, the pistons will be in line with one another, **ie. halfway through their stroke and No.1 cylinder piston MUST be descending (inlet stroke).**

IMPORTANT: Check that the crankshaft is in correct timed position – the reference pin on the crankshaft gear must be positioned level with, **but on the opposite side to**, the RPM sensor. Check that camshaft "timing slots" are in line with the side entry holes in the camshaft housing (see VS1400/02).

VS1400/02 Camshaft Setting Tools

4.2.3 Remove the sealing plugs from the camshaft housing. Visually check that the camshaft 'timing slots' are in line with the entry hole and insert VS1400/02 Tools, holding the centre spindle steady whilst screwing in the main body of the tool.

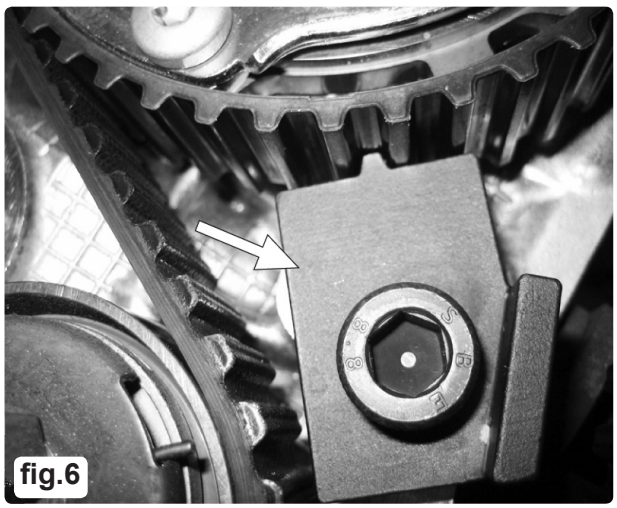


fig.6

VS4911 Camshaft Sprocket Locking Tool
VS4911 Locking Tool is bolted to the engine and locates in to the teeth of the camshaft sprocket in order to “lock” the sprocket when releasing and tightening the camshaft sprocket bolt.

4.2.4 Fit VS4911 Locking Tool to the engine, as shown in Fig.6, and firmly secure in place using the bolt provided in the VS4510A Kit.

4.2.5 Slacken the timing belt tensioner nut to release tension off the belt and remove the old belt.

4.2.6 If VVT (variable valve timing) is fitted, undo the camshaft sprocket bolt cover and remove it.
NOTE: Be prepared for oil to leak out.

4.2.7 Release and replace the camshaft sprocket bolt with a new bolt. Screw in new bolt finger-tight allowing the sprocket to turn on the camshaft, but not tilt.
IMPORTANT: Remove VS4911 Sprocket Locking Tool

4.2.8 Fit the new timing belt.
After fitting a new belt the tensioner is initially set at maximum tension using VS1400/03 Tensioner Adjuster.

4.2.9 Re-fit VS4911 Camshaft Sprocket Locking Tool to the engine, and firmly secure in place using the bolt provided in the Kit.

4.2.10 Tighten the camshaft sprocket bolt and remove **all** timing tools. Turn the engine over, by hand, two revolutions. Adjust belt tension so that the tensioner marks align.

4.2.11 Turn the engine over by hand again and fit the Piston Position and Camshaft Setting Tools to check that the engine timing is correct.

4.3 1.4 16v. – 169A3.000
General
The timing belt replacement procedure is basically the same as described in Section 4.2, **EXCEPT** for this engine (169A3.000), VS1400/01 Piston Position Tools are replaced by new tool VS4951 Crankshaft Locking Tool to establish crankshaft timed position.
VS1400/02 Camshaft Setting Tools, VS4911 Camshaft Sprocket Locking Tool and VS1400/03 Belt Tensioner Adjuster are still used in exactly the same sequence and procedure as detailed in Section 4.2.
IMPORTANT: Check that the crankshaft is in correct timed position – the reference pin on the crankshaft gear must be positioned level with, **but on the opposite side to**, the RPM sensor.
Check that camshaft “timing slots” are in line with the side entry holes in the camshaft housing (see VS1400/02).

4.3.1 With the camshafts in timed position, fit VS1400/02 Camshaft Setting Tools (Pair) through the sides of the camshaft housing and locate into “timing slots” in the camshafts.

4.3.2 Check that the crankshaft is in timed position, slacken tensioner bolt and remove the old timing belt.

4.3.3 Fit VS4911 Locking Tool to the camshaft sprocket and release and replace the camshaft sprocket bolt with a new bolt. Screw in the new bolt finger-tight allowing the sprocket to turn on the camshaft, but not tilt.
IMPORTANT: Remove VS4911 Locking Tool.

4.3.4 Fit the new timing belt.

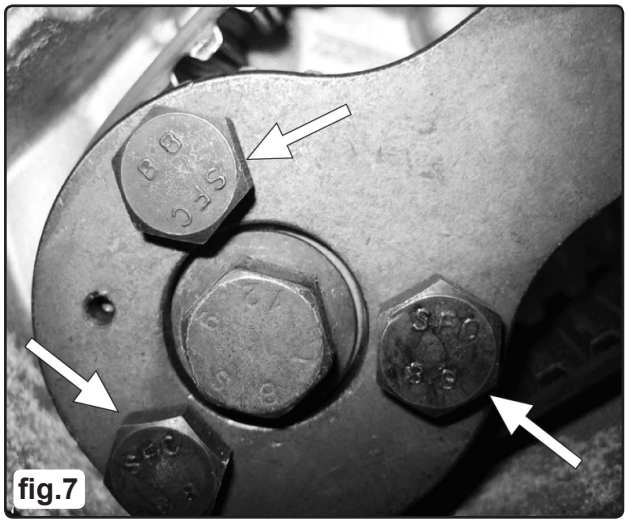


fig.7


fig.8

VS4951 Crankshaft Locking Tool
4.3.5 Fit VS4951 Crankshaft Locking Tool on to the crankshaft gear. Secure VS4951 Locking Tool to the crankshaft gear using the 3 bolts provided (fig.7) in the VS4510A Kit, and secure the Tool to the engine, as shown in Fig.8.
The timing belt tensioner is initially set at maximum tension using VS1400/03 Tensioner Adjuster.

4.3.6 Fit VS4911 Camshaft Sprocket Locking Tool to the engine, as shown, and firmly secure in place using the bolt provided in the Kit.

4.3.7 Tighten the camshaft sprocket bolt and remove **all** timing tools. Turn the engine over, by hand, two revolutions. Adjust belt tension so that the tensioner marks align.

4.3.8 Turn the engine over by hand again and fit the Crankshaft Locking Tool and Camshaft Setting Tools to check that the engine timing is correct.

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Sole U.K. Distributor
Sealey Group
Bury St. Edmunds
Suffolk.

01284 757500
01284 703534
www.sealey.co.uk
sales@sealey.co.uk