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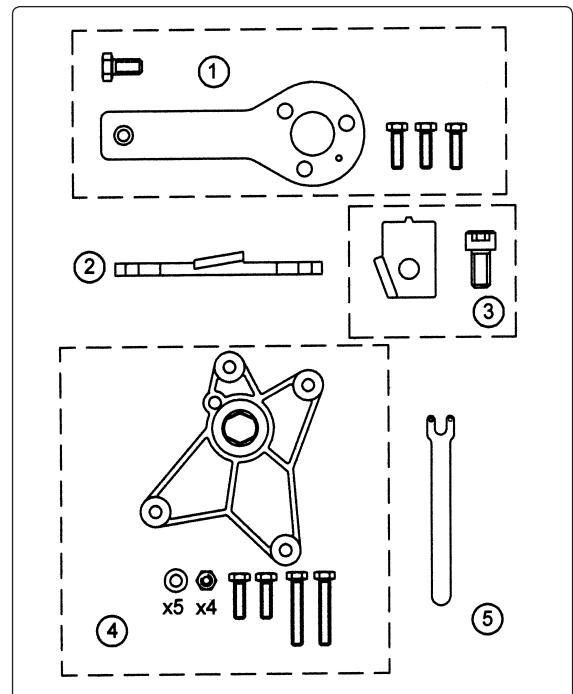
IMPORTANT: PLEASE READ THESE INSTRUCTIONS CAREFULLY. NOTE THE SAFE OPERATIONAL REQUIREMENTS, WARNINGS AND CAUTIONS. USE THE PRODUCT CORRECTLY AND WITH CARE FOR THE PURPOSE FOR WHICH IT IS INTENDED. FAILURE TO DO SO MAY CAUSE DAMAGE AND/OR PERSONAL INJURY AND WILL INVALIDATE THE WARRANTY. PLEASE KEEP INSTRUCTIONS SAFE FOR FUTURE USE.

1. 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.
- DO NOT** attempt to start engine or move vehicle whilst in gear with locking devices fitted.
- Always display warning notification on steering wheel when locking engine components.
- 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 valve head and 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.



2. CONTENTS & APPLICATIONS



Applications:
 FIAT 1.2 & 1.4 8v. Petrol engines in

FIAT
 New 500 Idea Grande Punto
 Linea Doblo Panda*

1.2 8v. – 169A4.000, 199A4.000
 1.4 8v. – 350A1.000
 *1.2 8v. (EVO2 only) – 188A4.000

Kit contents/spares

Item	Part Number	Description
1	VS4951	Crankshaft Locking Tool
2	VS4952	Camshaft Setting Plate
3	VS4953	Camshaft Sprocket Locking Tool
4	VS4954	Camshaft Cover Alignment Fixture
5	VS1400/03	Belt Tensioner Adjuster
--	VS4950-84	Case + Insert

3. INSTRUCTIONS



The VS4950 Setting/Locking Tool Kit covers timing belt replacement applications on Fiat 1.2 and 1.4 8v. petrol engines detailed under engine codes 169A4.000 (1.2), 199A4.000 (1.2) and 350A1.000 (1.4).

In addition the Kit is also applicable to the 1.2 8v. engine code 188A4.000 (EVO2 variant only).

Identification of the 1.2 EVO2 engines (Fiat Panda)

There are a number of variants of the 1.2 engine with code 188A4.000, including the EVO2 version. The EVO2 must not be confused with the early 188A4.000 engines which have a different timing tool requirement than VS4950 kit, and a different service procedure than that detailed below.

WARNING: The 188A4.000 engine must be correctly identified as an EVO2 variant to use the timing tools in Kit VS4950.

The original 188A4.000 engines have a square rubber press-fit oil filler plug. **EVO2 engines have a plastic round oil filler plug and also a camshaft cover which is fixed to the cylinder head by 8 bolts.** The original 188A4.000 camshaft cover only has 4 bolts.

VS4950 Petrol Engine Setting/Locking Tool Kit

Comprises: VS4951 Crankshaft Locking Tool
VS4952 Camshaft Setting Plate
VS4953 Camshaft Sprocket Locking Tool
VS4954 Camshaft Cover Alignment Fixture
VS1400/03 Belt Tensioner Adjuster

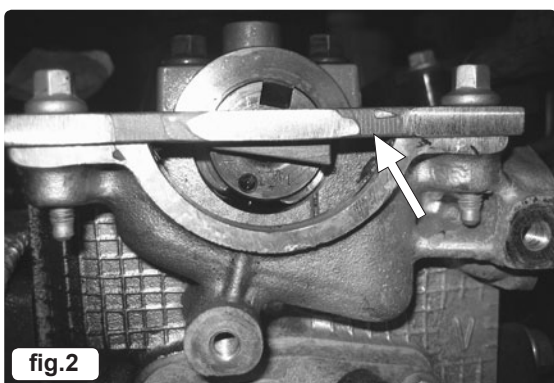
3.1 Timing Belt replacement

The 1.2 8v. engines are single camshaft engines and use Timing Tools VS4951, VS4952 and VS1400/03 from the VS4950 Kit.

The 1.4 8v. engine has VVT (variable valve timing), and in addition to the 3 tools above, this engine uses VS4953 and VS4954, from the VS4950 Kit.

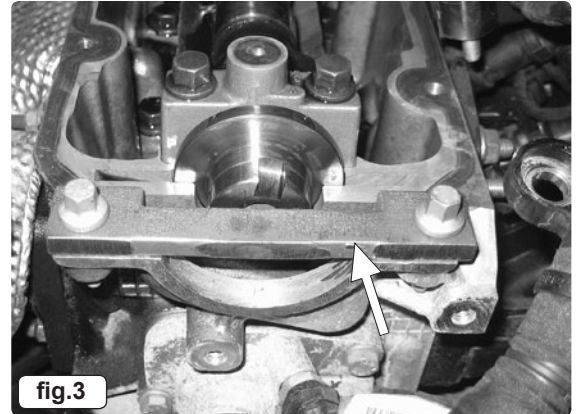
The initial preparation and dis-mantling of components in order to gain access to the timing belt, are basically the same for all these engines.

- 3.1.1 It will be necessary to remove the air filter assembly, engine timing sensor and right-hand road wheel / wheel arch panel.
- 3.1.2 The engine will require support as the engine mounting must be removed (timing side).
- 3.1.3 Disconnect spark plug leads and coil electrical connections/ support cover.
- 3.1.4 Remove the camshaft cover and gasket.



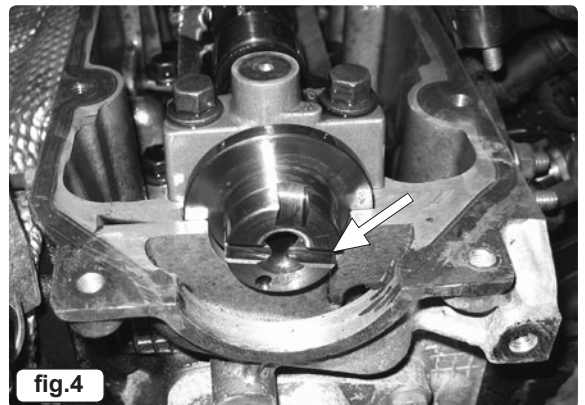
3.2 1.2 8v. 169A4.000, 199A4.000 and EVO2 only 188A4.000

- 3.2.1 Rotate the crankshaft to engine timing position and check the camshaft timing is correct by temporarily inserting VS4952 Setting Plate in to the "slot" at the rear of the camshaft, ensuring the camshaft position is not 180 degrees out (fig.2).
- 3.2.2 **IMPORTANT:** Remove the VS4952 Camshaft Setting Plate.
- 3.2.3 Slacken the timing belt tensioner nut to release tension off the belt and remove the old belt.
- 3.2.4 Counter-hold the camshaft sprocket with a suitable Sprocket Holding Tool, such as VS4844, and slacken the camshaft sprocket bolt. Leave the bolt finger-tight allowing the sprocket to turn on the camshaft, but not tilt.



VS4952 Camshaft Setting Plate

- 3.2.5 Fit VS4952 Camshaft Setting Plate in position at the rear of the camshaft and secure in place with two bolts (fig.3).



NOTE: The Setting Plate locates in to a "timing slot" in the rear of the camshaft (fig.4).



VS4951 Crankshaft Locking Tool

- 3.2.6 Ensure that the crankshaft is in timed position and fit the timing new belt.
- 3.2.7 Fit VS4951 Crankshaft Locking Tool on to the crankshaft gear. Secure Locking Tool to the crankshaft gear using the 3 bolts provided in the Kit, and secure the Tool to the engine, as shown in Fig. 5.

VS1400/03 Belt Tensioner Adjuster



fig.6

- 3.2.8 The VS1400/03 Tensioner Adjuster locates into the two holes in the tensioner roller (fig.6).
- 3.2.9 Using VS1400/03 Adjuster, turn the tensioner to its maximum tensioned position, and tighten the tensioner nut.
- 3.2.10 Replace the camshaft sprocket bolt with a new bolt.
WARNING: When tightening the camshaft sprocket bolt, counter-hold the camshaft sprocket with a suitable Sprocket Holding Tool. Do not use the timing tools to counter-hold as damage to tools and engine will result.
- 3.2.11 Using a Sprocket Holding Tool to counter-hold the sprocket, tighten the bolt to specified torque – 108 to 132Nm.
- 3.2.12 Remove the VS4951 Crankshaft Locking Tool and VS4952 Camshaft Setting Plate.
- 3.2.13 Turn the engine two revolutions, returning to timed position.

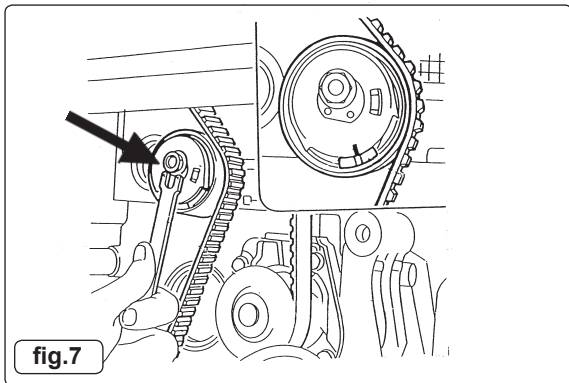


fig.7

- 3.2.14 Fit VS1400/03 Tensioner Adjuster to the tensioner (fig.7) and maintain its position whilst slackening the tensioner nut. Allow the automatic tensioner to achieve a position **where the front fork is aligned with the rear fork**. Tighten tensioner nut to specified torque – 25Nm.
- 3.2.15 Check that the engine timing is correct by fitting VS4951 Crankshaft Locking Tool and VS4952 Camshaft Setting Plate to the engine.
- 3.2.16 Remove all Tools.

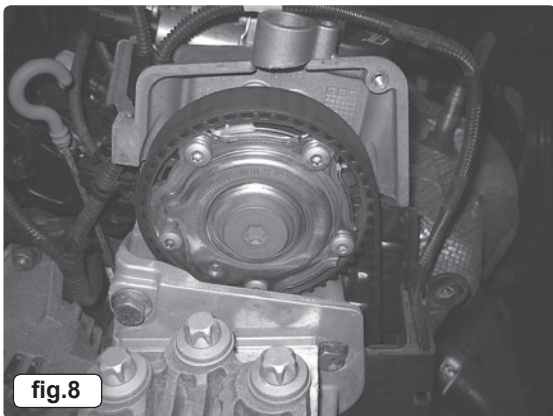


fig.8

3.3 1.4 8v engine 350A1.000 with VVT (variable valve timing)

NOTE: When a timing belt is replaced, the following “self-leaning” procedure should be carried out – Start the engine, without depressing the accelerator, and with the engine temperature at, or more than, 20 degrees C, allow the engine to idle for 10 seconds.

The initial preparation and dis-mantling of components in order to gain access to the timing belt, is basically the same as 1.2 8v.engines procedure detailed earlier.

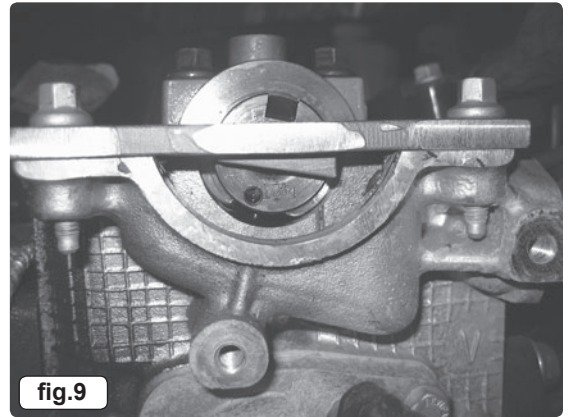


fig.9

- 3.3.1 Rotate the crankshaft to engine timing position and check the camshaft timing is correct by temporarily inserting VS4952 Setting Plate in to the “slot” at the rear of the camshaft, ensuring the camshaft position is not 180 degrees out (fig.9).
- 3.3.2 **IMPORTANT:** Remove the VS4952 Camshaft Setting Plate.

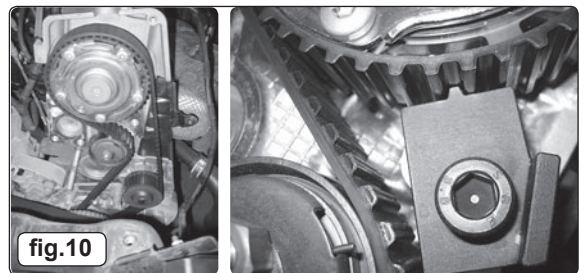


fig.10

VS4953 Camshaft Sprocket Locking Tool

- 3.3.3 VS4953 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.
- 3.3.4 Remove the exhaust manifold heat shield.
- 3.3.5 Fit VS4953 Locking Tool to the engine, as shown in Fig 10, and firmly secure in place using the bolt provided in the VS4950 Kit.
- 3.3.6 Slacken the timing belt tensioner nut to release tension off the belt and remove the old belt.

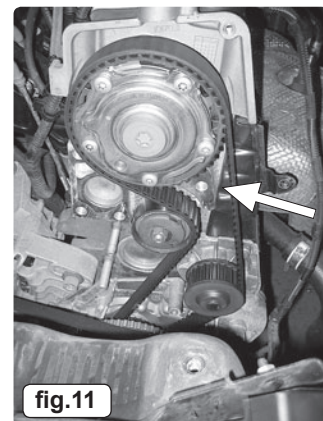


fig.11

- 3.3.7 Undo the camshaft sprocket bolt cover and remove it.
NOTE: Be prepared for oil to leak out.
- 3.3.8 Slacken the camshaft sprocket bolt. Leave finger-tight allowing the sprocket to turn on the camshaft, but not tilt.
- 3.3.9 **IMPORTANT:** Remove VS4953 Sprocket Locking Tool (fig.11).
- 3.3.10 Fit VS4952 Camshaft Setting Plate in position at the rear of the camshaft and secure in place with two bolts.
NOTE: The Setting Plate locates in to a “timing slot” in the rear of the camshaft.

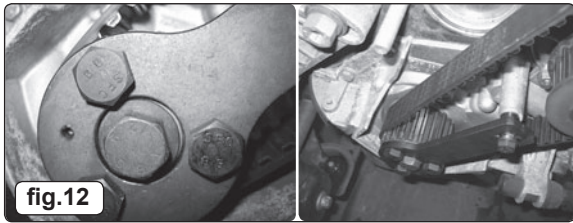


fig.12

- 3.3.11 Ensure that the crankshaft is in timed position and fit the new belt.
- 3.3.12 Fit VS4951 Crankshaft Locking Tool on to the crankshaft gear. Secure Locking Tool to the crankshaft gear using the 3 bolts provided in the Kit, and secure the Tool to the engine, as shown in Fig 12.

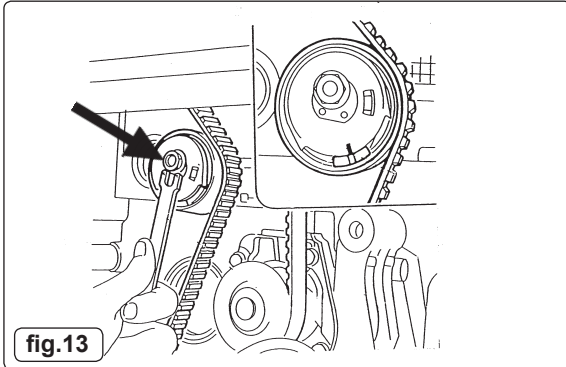


fig.13

- 3.3.13 Tension the timing belt by turning the tensioner **anti-clockwise**, with Adjuster VS1400/03 and **apply maximum tension**. Tighten the tensioner nut (fig.13).

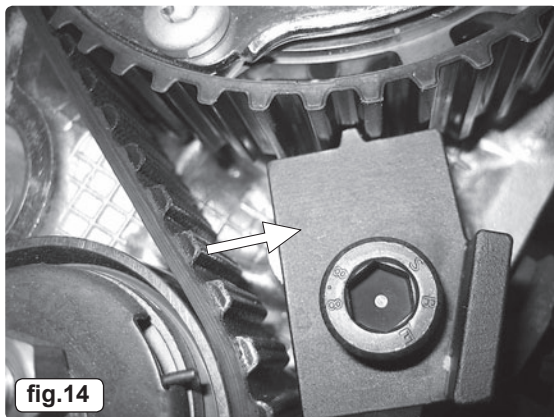


fig.14

- 3.3.14 Fit VS4953 Camshaft Sprocket Locking Tool to the engine, fitting the Tool into the teeth of the camshaft sprocket, and secure with the bolt supplied in the Kit. Tighten the bolt firmly (fig.14).
- 3.3.15 Remove the old camshaft sprocket bolt and screw in a new bolt. Tighten to specified torque – 180-220Nm. + 55 degrees.
- 3.3.16 Replace the sprocket bolt cover and tighten – 25-30Nm.
- 3.3.17 **IMPORTANT:** Remove the Camshaft Setting Plate, Crankshaft Locking Tool and Camshaft Sprocket Locking Tool.
- 3.3.18 Turn the engine two revolutions and return the engine to timed position.
- 3.3.19 Fit VS1400/03 Tensioner Adjuster to the tensioner and maintain its position whilst slackening the tensioner nut. Allow the automatic tensioner to achieve a position where the front fork is aligned with the rear fork. Tighten tensioner nut to specified torque – 25-30Nm.
- 3.3.20 Check that the engine timing is correct by fitting AST4951 Crankshaft Locking Tool and AST4952 Camshaft Setting Plate to the engine.
- 3.3.21 Remove all Tools.

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3.4 Camshaft Cover Alignment

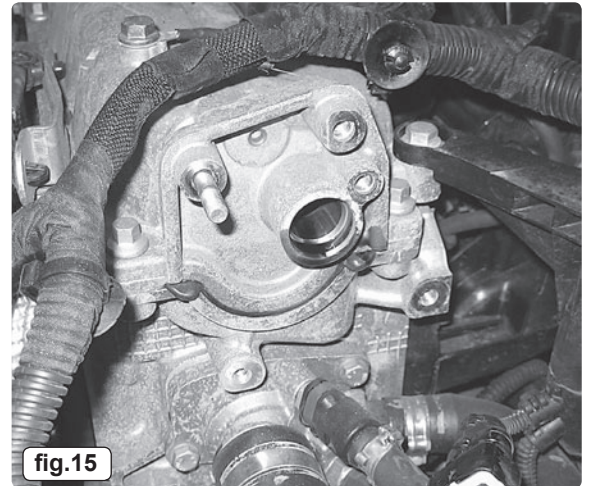


fig.15

VS4954 Camshaft Cover Alignment Fixture

- 3.4.1 On the 1.4 8v. engine, with VVT, the camshaft cover must be re-fitted using VS4954 Cover Alignment Fixture to ensure that the cover is correctly aligned to the cylinder head, in order that the camshaft timing sensor can be positioned correctly when re-installed (fig.15).

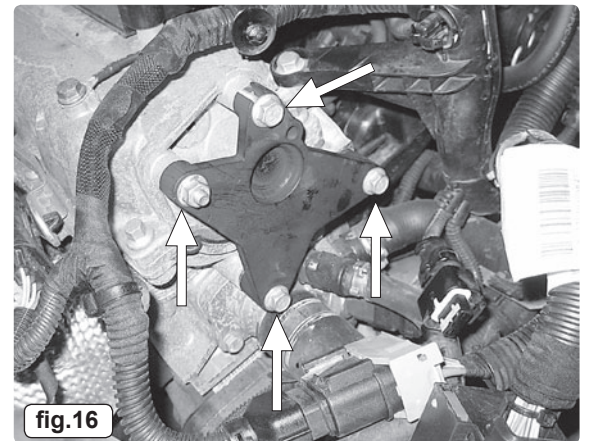


fig.16

- 3.4.2 To achieve correct alignment of the cover and cylinder head, the VS4954 Fixture is secured in place at 4 locations (2 on the cylinder head and 2 on the camshaft cover) (fig.16).

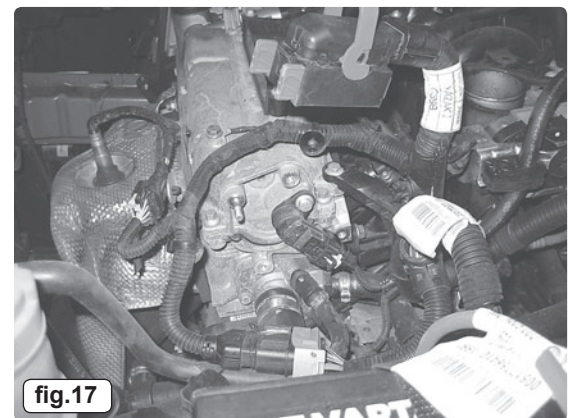


fig.17

- 3.4.3 It is essential that the camshaft sensor entry hole is positioned correctly relative to the camshaft. Therefore alignment of the camshaft cover must be accurately achieved using VS4954 Fixture (fig.17).