

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. 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 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. INTRODUCTION & APPLICATIONS

2.1 Introduction

VS4840 Diesel Engine Setting/Locking Tool Kit covers timing belt replacement applications for the Pumpe Düse range of engines in Audi, Seat, Skoda, Volkswagen and Ford.

2.2 Applications

VW GROUP 'PUMPE DÜSE' (Unit Injection) 1.2TDi, 1.4TDi and 1.9TDi and 2.0 TDi PD Diesel engines in

- AUDI:** A2, A3, A4, A6, Cabriolet
SEAT: Alhambra, Altea, Arosa, Cordoba, Ibiza, Leon, Toledo
SKODA: Fabia, Octavia, Superb
VOLKSWAGEN: Beetle, Bora, Caddy, Fox, Golf, Golf Plus, Jetta, Lupo, Passat, Polo, Sharan, Touran, Transporter
FORD: Galaxy (99-)

Engine Codes:

- 1.2TDi PD:** ANY, AYZ
1.4TDi PD: AMF, ATL, BAY, BHC, BMS, BNM, BNV, BWB
1.9TDi PD: AJM, ANU, ARL, ASZ, ATD, ATJ, AUJ, AVB, AVF, AVQ, AWX, AXB, AXC, AXR, BEW, BJB, BKC, BKE, BLS, BLT, BMT, BPX, BRB, BRM, BRR, BRS, BRU, BSU, BSW, BTB, BUK, BVK, BXE, BXF
2.0TDi PD: AZV, BDJ, BDK, BGW, BHW, BKD, BKP, BLB, BMA, BMM, BMN, BMP, BMR, BNA, BPW, BRC, BRE, BRF, BRT, BUZ, BE, BVF, BVG, BVH, BWV.



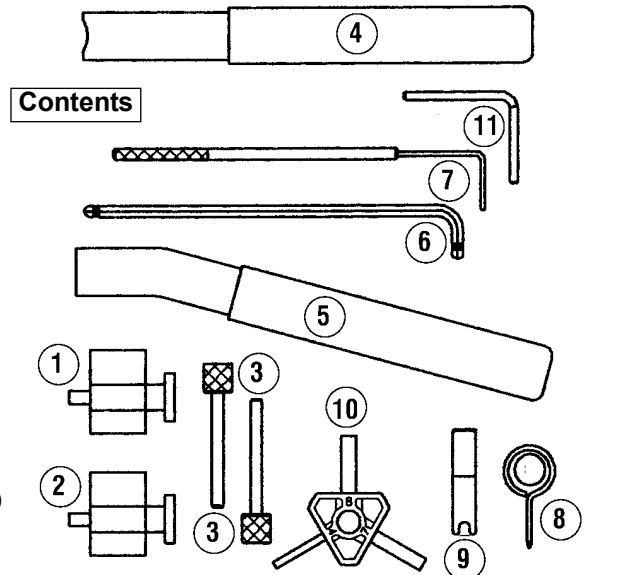
VS4840



Associated Tool required - VS4741 Front Panel Support Guide Set (Service Position)

3. CONTENTS

ITEM	PART NO.	DESCRIPTION
1	VS1245/01	Crankshaft Locking Tool (Gold/Round)
2	VS4836	Crankshaft Locking Tool (Silver/Oval)
3	VS124/V2	Camshaft Locking Pins (2 per kit)
4	VS1245/02	Tensioner Adjuster (1.2, 1.4 & 1.9)
5	VS12472	Tensioner Adjuster (2.0 & later 1.9)
6	VS4837	Tensioner Adjust Tool
7	VS4838	Tensioner Locking Tool
8	VS4640/T7	Tensioner Locking Pin (Mechanical Tensioner)
9	VS1245/03	Tensioner Locking Tool (Hydraulic Tensioner)
10	VS1245/04	Tensioner Setting Tool (Hydraulic Tensioner)
11	VS4840/V4	Auxiliary Belt Tensioner Locking Pin
--	VS4840/84	Case and Insert (not shown)
Additional Tool required:		
	VS4741	Front Panel Support Guide Set (Service Position)



4. INSTRUCTIONS

4.1 IMPORTANT INFORMATION FOR TOOL SELECTION

Since their introduction in 1999, these engines have undergone a number of changes, some of which dictate which timing tools must be used. These modifications have not necessarily changed the engine coding and therefore it is very important that a careful check of the engine features is made to ensure the correct timing tools are being used.

CRANKSHAFT LOCKING:- Check if a Round or an Oval Crankshaft Gear is fitted.

Original crankshaft gears are ROUND.

Use Tool VS1245/01 to position crankshaft at TDC - timing marks MUST align at 12 o'clock position (Fig.1).

Gradual introduction of OVAL crankshaft gears.

Use Tool VS4836 to position crankshaft at TDC - timing marks MUST align at 1 o'clock position (Fig.2).

CAMSHAFT SETTING:- Check if Single or Twin Camshaft Engine.

1.2TDi, 1.4TDi and 1.9TDi PD engines are Single Camshaft (8v).

Use 1 x VS124/V2 Locking Pin (Fig.3).

2.0TDi PD engines can be Single (8v) or Twin Camshaft (16v) engines.

For Twin Camshaft - Use 2 x VS124/V2 Locking Pins (Fig.4).

TIMING BELT TENSIONING:- Check if Hydraulic or Mechanical Tensioner fitted.

In 2002 some of the 1.2, 1.4 and 1.9 engines changed from a hydraulic belt tensioner to a mechanical tensioner.

2.0TDi PD engines have a mechanical tensioner.

Hydraulic Tensioners - Use tools VS1245/02 Adjuster, VS1245/03 Locking Tool and VS1245/04 Setting Tool (Fig.5).

Mechanical Tensioners - Use tools VS12472 Adjuster and VS4640/T7 Locking Pin (Fig.6).

ENGINE MOUNTING (REMOVAL) - BELT TENSIONING: Check if Support is "Large" or "Small" type of engine mounting.

From June 2005 some models have a modified "Larger" engine mounting fitted. This avoids having to remove the mounting and support the engine for belt replacement applications (Fig.7).

Also in 2004 the mechanical tensioner design was revised to include an additional hexagonal hole for turning to tension the belt (Fig.8).

Therefore: Alternative Belt Tensioning Tools are used to give access to the mechanical tensioner when the larger engine mounting is fitted and remains in place. These use the additional hexagonal hole in the tensioner.

Use tools VS4837 Adjuster and VS4838 Locking Tool (Fig.9).

Fig.1

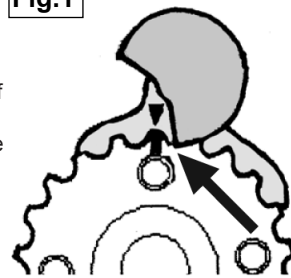


Fig.2

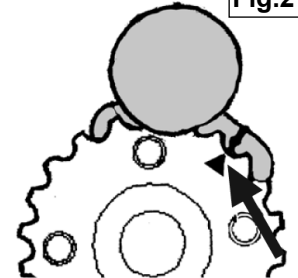


Fig.3

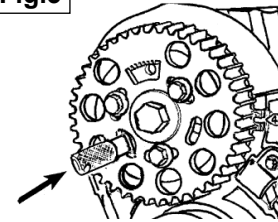


Fig.4

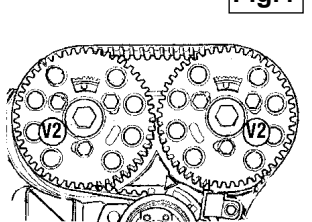


Fig.5

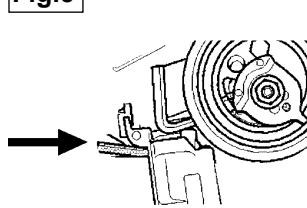


Fig.6

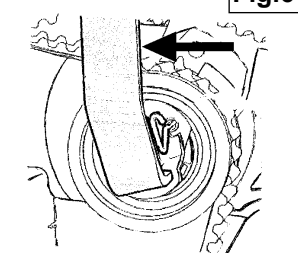


Fig.7

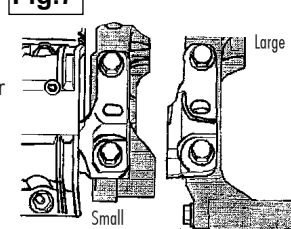


Fig.8

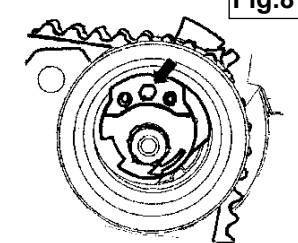
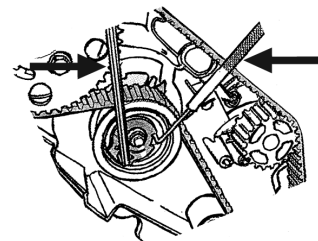


Fig.9

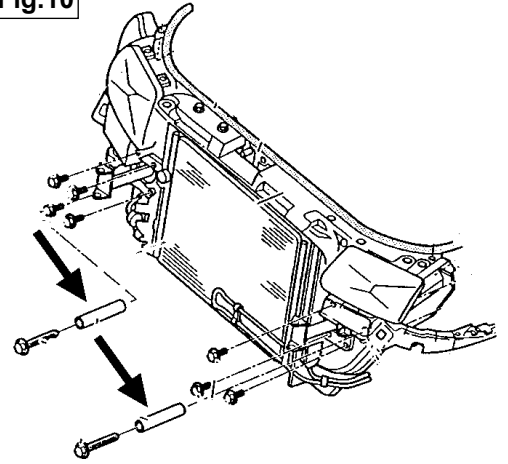


4.2 VS4741 Front End Support Guides - Service Position (Associated Tool, not in kit).

Almost all VW Group models have the facility of extending the front panel of the vehicle to provide increased access space in the engine compartment to carry out various service applications.

On a number of models, including VW Passat and Audi A4/A6 models moving the front end out to the "Service Position" is part of the timing belt replacement procedure. Use **VS124/02** Front Panel Support Guides for Audi and Passat (-00) and **VS4742** Guides for Passat (00-). Both Guides are included in **VS4741** Set (Fig.10).

Fig.10



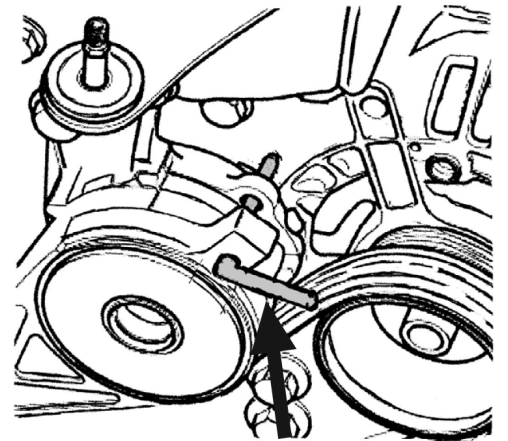
4.3 Preparation

Preparation of the engines and removal of obstructing components for belt replacement, varies according to model/engine but generally turbocharger and intercooler hoses will need to be removed along with timing covers and the crankshaft pulley. It will be necessary to correctly support the engine as mounting brackets will require removal, unless the new "Larger style" mounting has been fitted (see 4.1 - Important Information for Tool Selection).

WARNING: On some models the fuel lines will need to be detached from the engine cover. The fuel is pressurised and can be VERY HOT. Take great care to contain any escaping fuel spray and avoid spillage when detaching lines.

On models with AJM, ASZ, ATD, AUY engines, the offside headlight will need to be removed.

Fig.11



VS4840/V4 Auxiliary Belt Tensioner Locking Pin

On most of the applications, the tensioner of the auxiliary drive belt is 'locked' down using **VS4840/V4** Locking Pin and then the tensioner unit removed, allowing access to the front of the engine (Fig.11).

4.4 Timing Belt Replacement

The Pumpe Düse range of diesel engines all have very similar procedures for timing belt replacement and timing adjustment.

A number of the timing tools are common to all engines and tool use is detailed in these instructions, in the following procedural order:-

Crankshaft Locking (4.4.1) - use **VS1245/01 (Gold)** on engines with 'Round' crank gear or **VS4836 (Silver)** on engines with 'Oval' crank gear

Camshaft Locking (4.4.2) - Single camshaft engines - 1.2, 1.4, 1.9TDi PD, 2.0TDi(8v), and Twin camshaft engines - 2.0TDi PD (16v)

Timing Belt Tensioners (4.4.3) - Hydraulic Tensioners

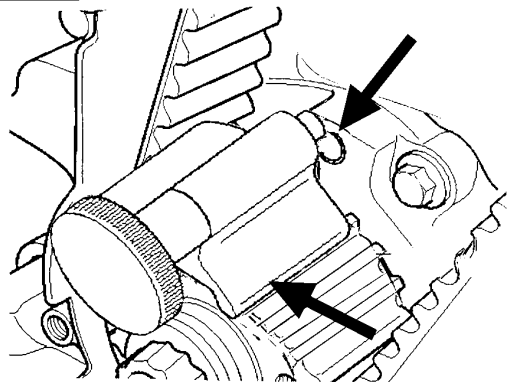
Timing Belt Tensioners (4.4.4) - Mechanical Tensioners (02-)

Timing Belt Tensioners (4.4.5) - Mechanical Tensioners (04-)

Checking & Adjusting Timing (4.4.6) - Single camshaft engines - 1.2, 1.4, 1.9TDi and 2.0TDi PD

Checking & Adjusting Timing (4.4.7) - Twin camshaft engines - 2.0TDi PD

Fig.12



IMPORTANT: The engine must be **COLD** when carrying out timing belt replacement applications.

4.4.1 Crankshaft Locking

VS1245/01 (Gold) and VS4836 (Silver) Crankshaft Locking Tools

The crankshaft is turned **clockwise** to No.1 cylinder TDC position. TDC position can be confirmed by:- Checking that the gear segment in the camshaft sprocket window is on top and the mark on the rear belt guard is aligned with the marking on the camshaft sensor wheel, located behind the sprocket (Figs.14, 15 and 16).

WARNING: Ensure that the correct Crankshaft Locking Tool is used for the type of Crank Gear fitted.

The crankshaft gear is locked in timed position using **VS1245/01** Locking Tool (Gold) for engines with a 'Round' crankshaft gear, or **VS4836** Locking Tool (Silver) for engines with an 'Oval' crankshaft gear. The tool locates into the gear teeth and at the same time into the hole in the oil seal housing (Fig.12).

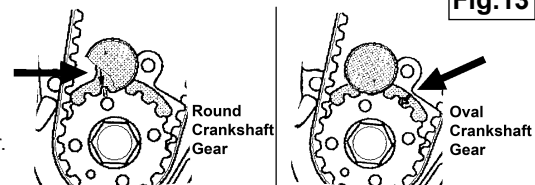
NOTE: The tool **slides** into the gear teeth **from the front face** of the crankshaft gear. It cannot locate correctly if only placed directly onto the top of the gear.

WARNING: The timing mark "arrow" on the Crankshaft Locking Tools MUST align with the timing mark on the crankshaft gear (Fig.13). If the incorrect tool has been selected, the timing marks will not align.

Temporarily remove the plastic knob off VS1245/01 Crank Locking Tool to improve visibility of the timing marks.

IMPORTANT: Crankshaft Locking Tools **MUST NOT** be located in position whilst the engine is being rotated. The engine must be positioned at TDC **BEFORE** the tool is fitted. If the engine is turned past the TDC position, turn the crankshaft back ¼ turn and then forward again to insert the Tool.

Fig.13

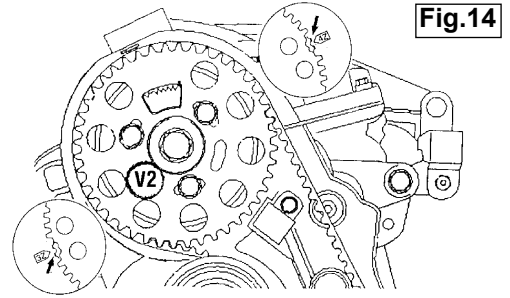


Timing marks on the Crankshaft Locking Tools and gear must align

4.4.2 Camshaft Locking

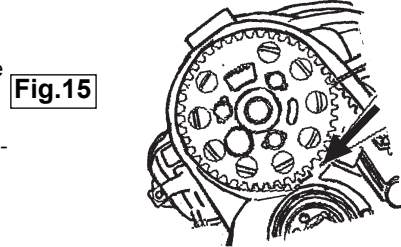
Single camshaft engines - 1.2, 1.4, 1.9 and 2.0TDi PD

Check that the gear segment in the camshaft sprocket window is on top and the mark on the rear belt guard is aligned with the marking on the camshaft sensor wheel, located behind the sprocket. On some engines the marks are **3Z** (on left) for 3 cylinder engines, or with **4Z** (on right) for 4 cylinder engines (**Fig.14**). On other engines the mark position will be as shown (**Fig.15**).



Twin camshaft engines - 2.0TDi PD

Check that the gear segments in the "windows" are on top (in both camshaft sprockets) and that the timing marks on the rear cover and camshaft sensor wheel align (**Fig.16**).



VS124/V2 Camshaft Locking Pins

Single camshaft engines - VS124/V2 Locking Pin is inserted through the free elongated hole on the left hand side of the camshaft sprocket and passes through the sprocket/sprocket carrier and into the datum hole in the cylinder head.

Twin camshaft engines - The kit includes 2 x **VS124/V2** Pins. Both Pins are required for the 2.0TDi PD twin camshaft engine. Insert into the free elongated holes - on the left hand side of the Exhaust camshaft sprocket and on the right hand side of the Inlet camshaft sprocket.

Fig.15

4.4.3 Hydraulic Timing Belt Tensioners (Automatic) - Single camshaft engines

The hydraulic (automatic) timing belt tensioner requires special tools **VS1245/03** Locking Tool, **VS1245/04** Setting Tool (Gap Setting) and **VS1245/02** Tensioner Adjuster which locates in to the two holes in the tensioner pulley.

VS1245/03 Tensioner Locking Tool

Using a suitable allen key locate onto the tensioner and turn it **anti-clockwise** to depress the tensioner until **VS1245/03** Tensioner Locking Tool can be inserted (**Fig.17**).

IMPORTANT: Ensure the allen key is inserted fully into the hexagon as this is quite shallow and could be rounded off if the allen key slips out.

Slacken the tensioner nut and remove the automatic tensioner device and timing belt. Check that the Crank Locking Tool, Camshaft Locking Pin and Tensioner Locking Tool are all in place and that all timing marks align.

Loosen the 3 camshaft sprocket bolts and turn the sprocket fully clockwise so that the bolts are at the ends of the elongated holes. Tighten bolts finger-tight only.

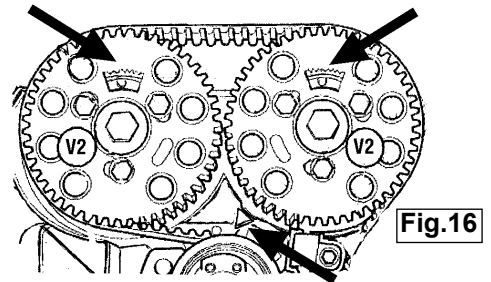


Fig.16

VS1245/02 Tensioner Adjuster

Locate **VS1245/02** Adjuster into the two holes in the tensioner eccentric (**Fig.18**), and turn it **clockwise** until pointer (1) comes to a stop at position (2) - (refer to **Fig.19**).

Fit new timing belt in the following order - camshaft sprocket, tensioner, crankshaft gear, water pump sprocket and Install the tensioner device.

IMPORTANT: The belt must be taut between the sprockets on the side opposite the tensioner.

Turn the tensioner eccentric slowly **anti-clockwise**, using **VS1245/02** Adjuster, back towards position (3) until the **VS1245/03** Tensioner Locking Tool can be easily removed.

NOTE: Ensure **VS1245/02** Adjuster remains in this position.

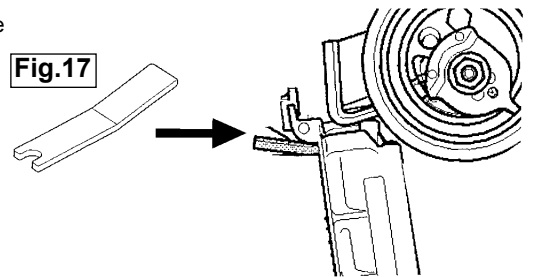


Fig.17

VS1245/04 Tensioner Setting Tool (Fig.20)

The **VS1245/04** Setting Tool provides 4mm, 7mm and 8mm pins for setting the gap on the tensioner at position **A**, (refer to **Fig.19**), as follows -

ANY and **AYZ** engines - 7mm ± 1mm.

PD Engines with Hydraulic Tensioner, (Except **ANY** and **AYZ**) - 4mm ± 1mm.

Insert the appropriate size pin from **VS1245/04** at position "A" (refer to **Fig.19**), and using **VS1245/02** Adjuster carefully allow the tensioner to slowly move **clockwise** to adjust the distance at position "A" to the pin diameter. Tighten tensioner nut.

Tighten camshaft sprocket bolts and remove locking tools from crankshaft and camshaft.

Turn the crankshaft twice, by hand, and return the engine to TDC position. Check that the tensioner dimension at position "A" is correct to size specification.

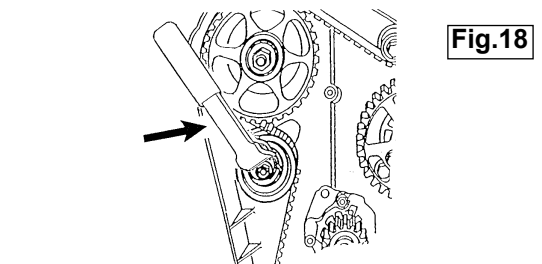


Fig.18

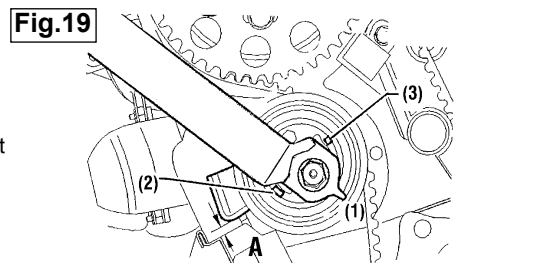


Fig.19

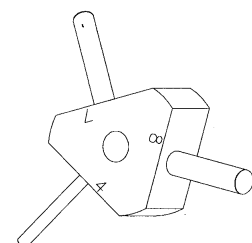


Fig.20

4.4.4 Mechanical Timing Belt Tensioners - Single camshaft engines (02-) and Twin camshaft engines

The mechanical timing belt tensioner requires special tools

- VS4640/T7 Locking Pin
- VS1245/02 Tensioner Adjuster - 1.2, 1.4 & 1.9TDi PD engines
- or VS12472 Tensioner Adjuster - 2.0TDi PD engines

Ensure the crankshaft is 'locked' with VS1245/01 (Round Gear) or VS4836 (Oval Gear) and the VS124/V2 Locking Pins are locking the camshafts (one for single cams and both for twin cams, as described earlier).

Loosen the camshaft sprocket bolts so the sprocket(s) can be moved within the elongated holes, but not tilt.

Slacken the tensioner nut and using the appropriate Adjuster (VS1245/02 or VS12472) turn the tensioner **anti-clockwise** until VS4640/T7 Locking Pin can be inserted (Fig.21). Turn the tensioner **fully clockwise** until it reaches the stop and tighten pulley nut. Remove the old timing belt.

Check that crankshaft and camshaft locking tools are in place and timing marks align. Ensure that the tensioner retaining "lug" is fully engaged (seated properly in the rear toothed belt guard).

NOTE: Turn the camshaft sprockets(s) **clockwise** in the elongated holes. Fit the new timing belt commencing at the crankshaft gear.

Slacken the tensioner nut and using VS1245/02 or VS12472 Adjuster turn the tensioner anti-clockwise until VS4640/T7 Locking Pin can be removed. Now turn the tensioner **clockwise** until the tensioner pointer is aligned with the 'notch' in the back plate (Fig.22).

NOTE: Tensioner pulley nut must not be allowed to turn. Restrain movement of the tensioner using the Tensioner Adjuster and tighten pulley nut.

IMPORTANT: The tensioner pointer may be allowed to move **clockwise a maximum of 5mm** to the right of the 'notch' in the back plate **DO NOT** adjust this position as it will correct and settle after the engine has run for a while.

Using a suitable Sprocket Holding Tool keep the belt under tension by applying pressure on sprocket anti-clockwise whilst counter-holding the sprockets and tighten camshaft sprocket bolts. Remove locking tools from crankshaft and camshaft.

Turn the crankshaft over twice, by hand, and return the engine to TDC position fitting the appropriate Crankshaft Locking Tool.

Ensure all timing marks align and check that the Camshaft Locking Pins can be easily inserted. Check that the tensioner pointer is in line with the 'notch'. Remove all timing tools.

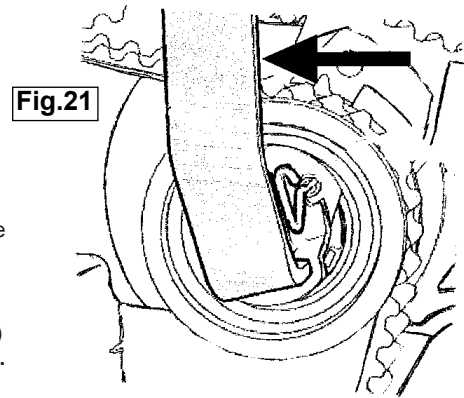


Fig.21

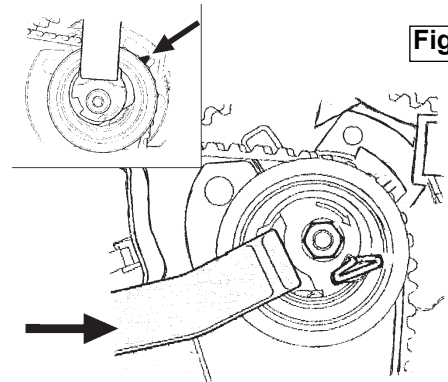


Fig.22

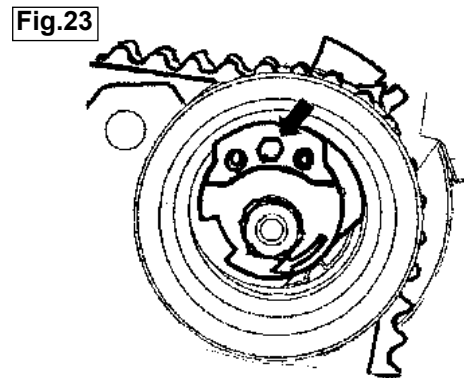


Fig.23

4.4.5 Mechanical Timing Belt Tensioners - (04-)

In 2004 the mechanical tensioner was revised to include an additional hexagon hole for tensioning the belt - (Fig.23).

VS4837 Adjusting Tool and VS4838 Locking Tool

Alternative Belt Tensioning Tools are used to allow access to the mechanical tensioner when the "larger type" engine mounting is fitted to avoid having to remove the mounting/support the engine (Fig.24).

Use VS4837 Adjuster in the hexagon hole to turn the tensioner and VS4838 to "lock" the tensioner (Fig.25).

The procedure for tensioning the timing belt when using these tools is the same as the earlier mechanical tensioner.

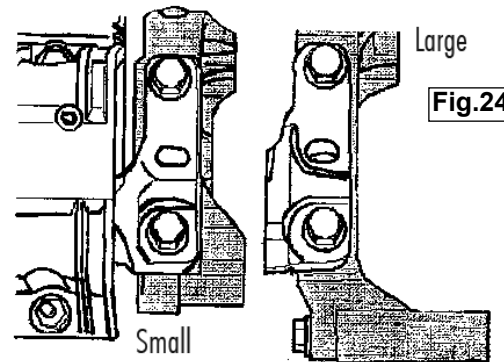


Fig.24

4.4.6 Checking & Adjusting valve timing - Single camshaft engines - 1.2, 1.4, 1.9TDi PD

Turn the crankshaft to TDC position and insert the correct Crankshaft Locking Tool. Check that all timing marks align and that VS124/V2 Locking Pin can be inserted easily to lock the camshaft.

If VS124/V2 Pin cannot be inserted - Pull the Crankshaft Locking Tool forward on the crankshaft gear so its lug is no longer engaged in the hole in the oil seal housing.

Turn the crankshaft until VS124/V2 Locking Pin can be inserted in the camshaft.

Loosen the 3 Camshaft sprocket bolts and turn the crankshaft **anti-clockwise** until the lug of the Crankshaft Locking Tool just passes the hole in the oil seal housing. Turn the Crankshaft **clockwise** until the Crankshaft Locking Tool can again be inserted into the hole in the oil seal housing to lock the crankshaft.

Tighten the 3 Camshaft sprocket bolts and remove all timing tools.

Turn the crankshaft over twice, by hand, and return the engine to TDC position, fitting the Crankshaft Locking Tool.

Ensure all timing marks align and check that the Camshaft Locking Pin can be easily inserted. Remove all timing tools.

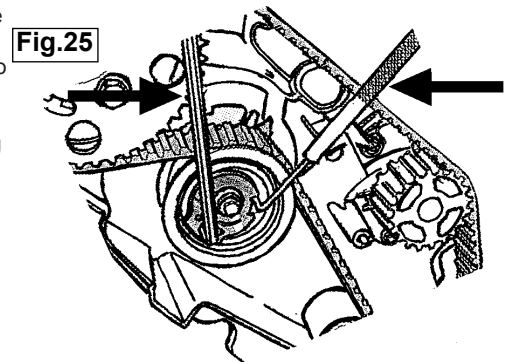


Fig.25

4.4.7 Checking and Adjusting valve timing - Twin camshaft engines - 2.0TDi PD

Turn the crankshaft over twice, by hand, returning the engine to TDC and just before achieving TDC, insert the **VS124/V2** Camshaft Locking Pin to lock the left hand (Exhaust) camshaft sprocket.

Check if the right hand sprocket can be locked with the other **VS124/V2** Pin and that the Crankshaft Locking Tool can be inserted and the belt tensioner pointer is in the centre or a **maximum of 5mm to the right** of the 'notch' in the base plate.

(1) If the right hand camshaft sprocket **CANNOT** be locked - loosen it's 3 bolts and using a spanner on the centre bolt, turn the sprocket until **VS124/V2** Pin can be inserted. Tighten the 3 bolts.

Remove tools, rotate crankshaft, by hand, two turns returning to TDC.

Repeat the timing check by inserting crankshaft and camshaft locking tools.

Check belt tensioner pointer position, refer to **4.4.4 - Mechanical Timing Belt Tensioners**.

(2) If the crankshaft **CANNOT** be locked - insert **VS124/V2** Locking Pins to lock both camshaft sprockets and loosen the 6 Camshaft sprocket bolts.

Turn the crankshaft, in the normal direction of rotation until the Crankshaft Locking Tool can be correctly inserted.- see note under **4.4.1 - Crankshaft Locking** on action if crankshaft is rotated passed TDC position.

Tighten the 6 Camshaft sprocket bolts.

Remove tools, rotate crankshaft, by hand, two turns returning to TDC.

Repeat the timing check by inserting crankshaft and camshaft locking tools.

Check belt tensioner pointer position - **4.4.4 - Mechanical Timing Belt Tensioners**.



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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