SEALEY *Professional* TOOLS
# AUTO SERVICE LINE

Instructions for:

## PETROL ENGINE SETTING/LOCKING KIT - FORD

Model No: **VS4404C**

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.**
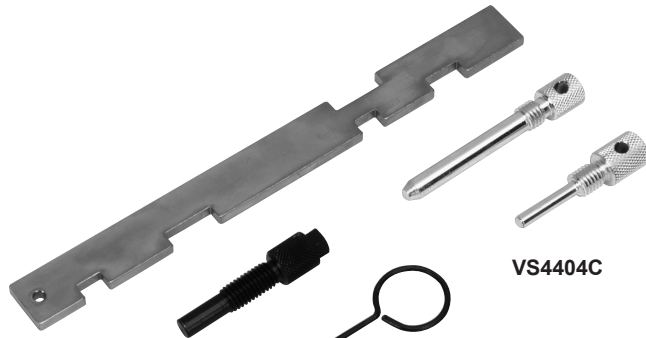
VS4404C
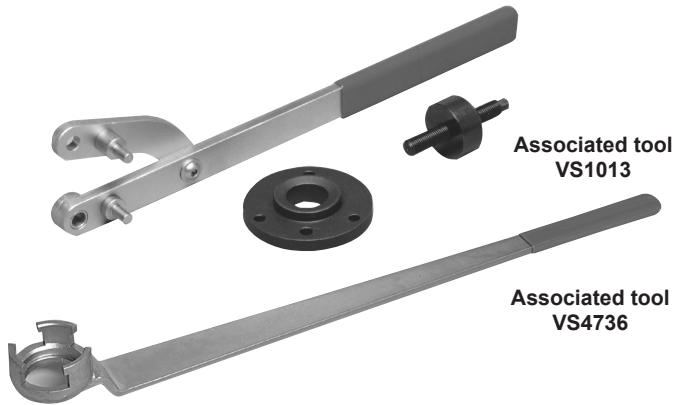
Associated tool **VS1013**

Associated tool **VS4736**

FORD 1.25, 1.4, 1.6, 1.7, 1.8 & 2.0 Twin Cam 16v. DURATEC Petrol engines (Belt & Chain) in
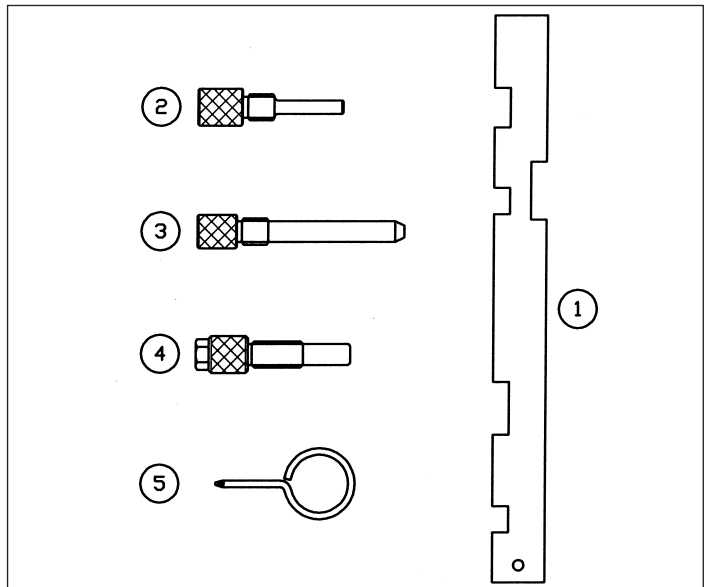
FORD

Fiesta / Courier	Fusion	Puma
Focus / C-Max	Mondeo	Cougar
S-Max	Galaxy	Tourneo Connect
Transit Connect		

MAZDA

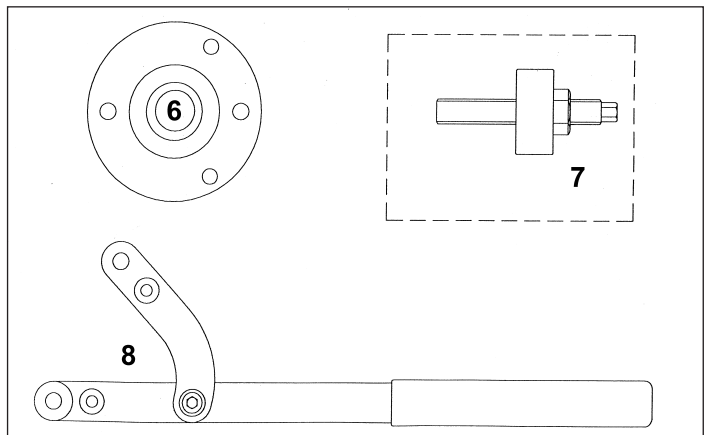|				
121	2	3	6	Tribute

Refer to the Application Chart on the following page(s) for specific model information

3. CONTENTS / ASSOCIATED TOOLS

AST4404C Set
1	VS4933	Camshaft Setting Plate
2	VS115/02	Crank TDC Location Pin
3	VS115/03	Crank TDC Location Pin
4	VS3032/21	Crank Holding Tool (+ Crank Pulley Bolt Tightening).
5	VS4640/T7	Timing Belt Tensioner Locking Pin

VS1013 Set
6	VS1013/01	Pulley Removal Plate
7	VS1013/02	Installer
8	VS1013/03	Holding Tool

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.

WARNING: The warnings, cautions and instructions discussed in this manual cannot cover all possible conditions and situations that may occur. It must be understood that common sense and caution are factors which cannot be built into this product, but must be applied by the operator.

2. INTRODUCTION / APPLICATIONS

Kit covers all later Duratec petrol engines. Includes revised design camshaft setting plate and tensioner locking pin. This kit covers the complete range of Ford Duratec engines 1.25 through to 2.0 16v in both belt and chain drive variants.

VS4404C | Issue No:1 - 23/07/08

Models / Engine codes:	VS4404C Set Tools					Associated Tools: Crank Pulley Holding Remover / Installer	
	VS4933	VS115/02	VS115/03	VS3032/21	VS4640/T7	VS1013	VS4736
FORD (Duratec)							
Fiesta / Courier (96 – 3 / 97) Automatic Tensioner 1.25 – DHA / DHB / DHC / DHD (Belt)	●	●				VS1013/02 Installer only	
Fiesta / Courier (4/97-02) Semi-Automatic Tensioner 1.25 – DHA / DHB / DHC / DHD / DHE / DHF / DHG (Belt) 1.4 – FHA / FHE (Belt) 1.6 – L1T / L1V (Belt)	●	●		●		VS1013/02 Installer only	
Fiesta / Fusion (02-08) 1.25 – F8JA / F8JB / FUJA / M7JA / M7JB (Belt) 1.4 – FXJA / FXJB (Belt) 1.6 – FYJA / FYJB (Belt)	●			●	●		
Fiesta 2.0 ST150 (04-08) N4JB (CHAIN)	●	●					
Puma (97-02) 1.4 – FHD / FHF (Belt) 1.6 – L1W (Belt) 1.7 – MHA / MHB (Belt)	●	●				1.4/1.6 –7/98 1.7 All	
Focus / C-Max (98-08) 1.4 – FXDA / FXDB / FXDC / FXDD / ASDA / ASDB / FXJA (Belt) 1.6 – FYDA / FYDB / FYDC / FYDD / HWDA / HWDB (Belt)	●			●	Focus 9 / 03 on C-Max 4 / 05 on		
Focus (98-05) 1.8 – EYDB / EYDC / EYDD / EYDE / EYDF / EYDG / EYDI / EYDJ (Belt) 2.0 – EDDB / EDDC / EDDD / EDDF (Belt)	●		●				
Focus 2.0RS / ST170 (01-05) HMDA / ALDA (Belt)	●		●	RS			
Focus / C-Max (03-08) 1.8 – QQDA / QQDB / QQDC / CSDA / CSDB (CHAIN) 2.0 – AODA / ADOB (CHAIN)	●	●					●
Mondeo (93-98) 1.6 – L1F / L1J (Belt) 1.8 – RKA / RKB (Belt) 2.0 – NGA (Belt)	●						
Mondeo (97-00) 1.6 – L1L / L1N / L1Q (Belt) 1.8 – RKF / RKH / RKJ / RKK (Belt) 2.0 – NGB / NGC / NGD (Belt)	●		●				
Mondeo (00-07) 1.8 – CCBB / CGBA / CGBB / CHBA / CHBB (CHAIN) 2.0 – CJBA / CJBB (CHAIN)	●	●					●
Cougar (98-01) 2.0 – EDBA / EDBB / EDBC / EDBD (Belt)	●		●				
S-Max / Galaxy (06-08) 2.0 – AOWA (CHAIN)	●			●			
Tourneo Connect / Transit Connect (02-06) 1.8 – EYPA / EYPC (Belt)	●		●				
MAZDA 121 (95-00) 1.25 – DHA (Belt)	●	●				VS4627 Installer only	
2 (02-07) 1.25 – FUJA / FUJB (Belt) 1.4 – FXJA / FXJB (Belt) 1.6 – FYJA (Belt)	●			●	●		
3 (03-06) 6 (02-07) 1.8 - L8 (CHAIN) 2.0 – LF (CHAIN)	●	●					●
Tribute (01-04) 2.0 – YF (Belt)	●		●				

VS4404C | Issue No:1 - 23/07/08

## 4. INSTRUCTIONS

Engine timing – General Guide
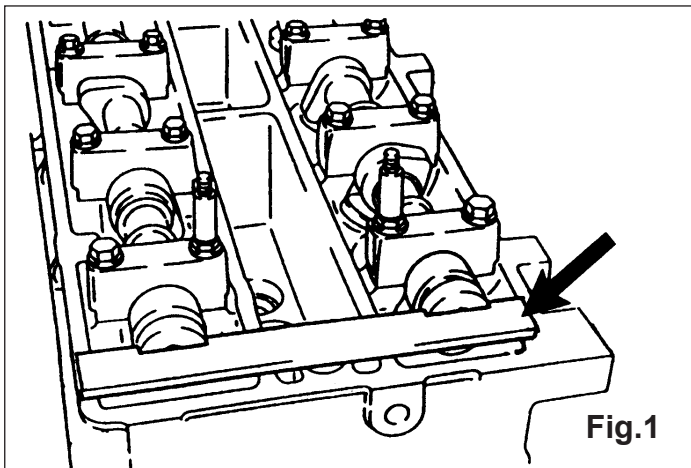
Fig.1

4.1 VS4933 Camshaft Setting Plate

On all current Ford 16v. twin camshaft engines (Duratec), VS4933 Setting Plate is used to lock the camshafts in the correct timing position via slots located at the rear of the camshafts. (Fig.1).

For timing applications it is important to ensure that the crankshaft is at TDC (see VS115/02, VS115/03 and VS3032/21), and that VS4933 Setting Plate is in position on the camshafts.

For timing belt replacement applications, the tensioner can then be slackened/compressed and the timing belt removed.


Fig.2
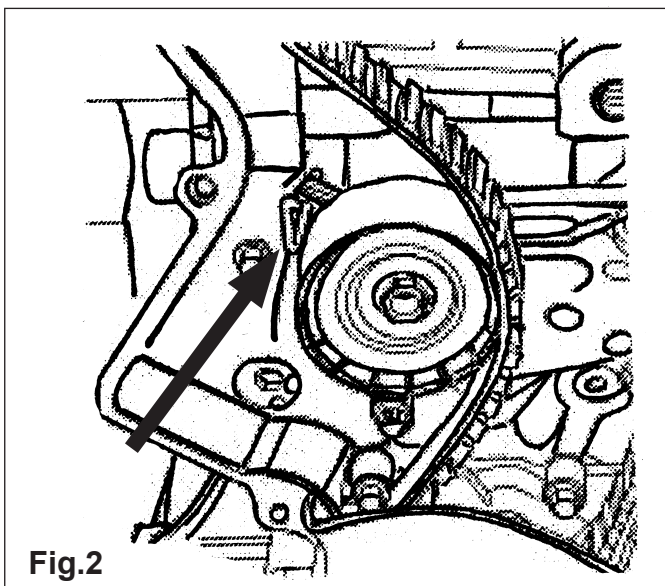
4.1.1 VS4640/T7 Belt Tensioner Locking Pin

1.25 / 1.4 / 1.6 engines in Fiesta and Fusion (02-08), and 1.4 / 1.6 engines in Focus/C-Max can have a timing belt tensioner which must be 'locked back' away from the belt to release tension off the timing belt during removal.

VS4640/T7 Locking Pin is inserted in to the tensioner to maintain tension off the belt. (Fig.2).

Once a new belt is fitted the VS4640/T7 Pin is pulled out allowing the tensioner to react on the belt and apply tension.


Fig.3
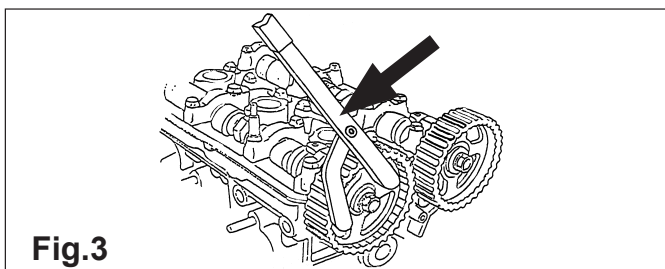
4.1.2 Sprocket Holding Tool

For timing belt replacement applications, the VS4933 Setting Plate MUST BE 'locking' the camshafts in position before the camshaft sprockets can be loosened. Use a suitable sprocket Holding Tool to counter-hold the camshaft sprockets whilst releasing the centre bolt. Some camshafts provide a hexagon to locate a spanner to counter-hold the camshaft. (Fig.3).

4.1.3 For all applications, use the appropriate TDC Location Pin ensure the crankshaft is at TDC. Remove the engine/crank blanking plug to allow the appropriate Location Pin to be screwed into position and then **carefully** rotate the crankshaft until the web **rests** against the pin. **see VS115/02, VS115/03 & VS3032/21**

When a new timing belt is installed, the tensioner should be applied following the manufacturer's procedure. Then using a suitable sprocket Holding Tool, counter-hold the camshaft sprockets whilst tightening the centre bolt. Remove setting plate and TDC Location Pin.
Rotate the engine a least two revolutions and return to TDC position inserting location pin. Re-check camshaft position by ensuring that VS4933 Setting Plate can be easily inserted into its slots. If not, re-check tensioning procedure again.

NOTE: For early Fiesta / Escort 1.6i / 1.8i and Mondeo 1.6 / 1.8 / 2.0 (-98) 16v. engines, only VS4933 Cam Setting Plate is used. A TDC Location Pin entry point is not provided.

Fig.4
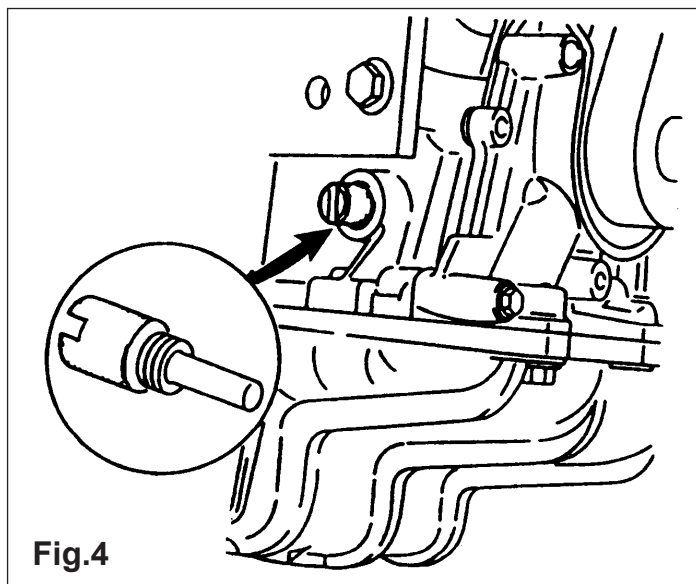
4.2 VS115/02, VS115/03 and VS3032/21 Crankshaft TDC Location Pins
Refer to the Application Chart for details of Location Pin use for each specific engine.

TDC Location Pins are used in conjunction with VS4933 Camshaft Setting Plate to ensure correct timing position is established and maintained during engine timing applications. (Fig.4).

4.2.1 In general terms VS115/02 Location Pin is used on the EARLY small size BELT engines and 1.8 / 2.0 CHAIN engines.

4.2.2 Ford replaced the VS115/02 with VS3032/21 for LATER small size BELT engines and also used it to counter-hold the crankshaft during the **TIGHTENING ONLY (NOT removal)** of the crankshaft pulley bolt. It is also used on the 2.0 CHAIN engines in S-Max/Galaxy, but not for counter-holding the crankshaft on this engine..
VS115/03 Location Pin is used on larger size BELT Duratec engines.

Application Summary

VS115/02 – **Fiesta / Courier 1.25 / 1.4 (- 97),and Puma 1.4 / 1.6 / 1.7 16v, (Belts) Focus / C-Max (0 3- 08) 1.8 / 2.0 CHAIN, Mondeo (00 - 07) 1.8 / 2.0 CHAIN**

VS115/03 – **Focus (98 - 05) 1.8 / 2.0, Mondeo (97-00)1.6 / 1.8 / 2.0 , Cougar 2.0 16v**. **Transit / Tourneo Connect 1.8 16v. (Belts)**

VS3032/21 – **Fiesta / Fusion (02 - 08) 1.25 / 1.4 / 1.6, Focus (98-08) 1.4 / 1.6 (Belts). S-Max / Galaxy (06 - 08) 2.0 CHAIN**

Remove the engine / crank blanking plug to allow the appropriate Location Pin to be screwed into position and then **carefully** rotate the crankshaft until the web **rests** against the pin.

VS4404C | Issue No:1 - 23/07/08

WARNING: VS115/02, VS115/03 and VS3032/21 Location Pins are used to position the crankshaft only. They MUST NOT be used to counter-hold the crank whilst RELEASING the crankshaft pulley bolt – see Crankshaft Pulley Removal & Installation Tools.

4.3 Crankshaft Pulley Removal & Installation Tools.

Some engines do not have a keyway/woodruff key on the crankshaft to position the pulley. In these cases pulleys can be friction fit or on a taper on the crank and retained by 'stretch bolts'.

There are a number of tools/methods employed to hold the crank pulleys whist they are being installed, dependant upon engine **– refer to Application Chart.**
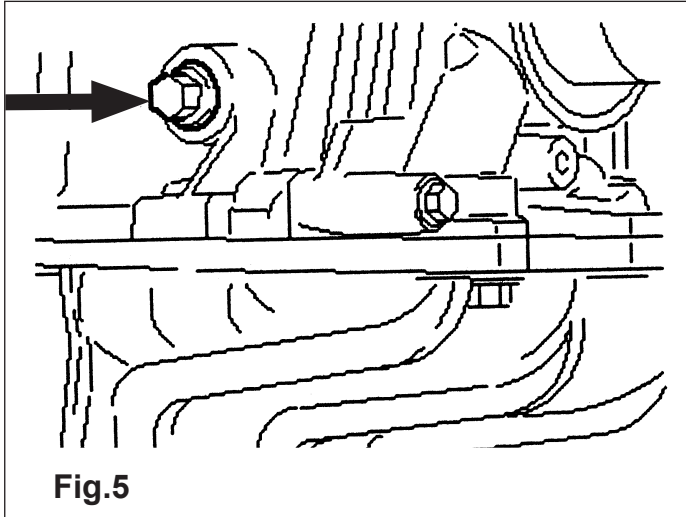
Fig.5

4.3.1 VS3032/21 Crankshaft TDC Location Pin and Holding Tool - (Crank Pulley Bolt tightening only)

Fiesta / Courier (97 - 08) 1.25 / 1.4, Fusion (02 - 08) 1.25 / 1.4, Focus (98 - 08) 1.4 / 1.6 /2.0RS / ST170. Belts – TDC Location and Crank Holding.

NOTE: S-Max/Galaxy 2.0 CHAIN for TDC Location only – see VS4736

VS 3032/21 Crankshaft TDC Pin is used to position the crankshaft at TDC for specific timing applications.
VS3032/21 Pin is also used on **specific engines for installing and tightening only of a new crankshaft pulley bolt – refer to Application Chart.**

VS3032/21 is screwed into the side of the engine and the crankshaft turned in the normal direction of rotation until the crankshaft web rests against the tool. This provides the counter-holding position whilst the pulley bolt is tightened. (Fig. 5).

WARNING: DO NOT use VS3032/21 for counter - holding when undoing the pulley bolt.

4.3.2 VS1013 Crankshaft Pulley Remover & Installer Set Associated Tools, not in VS4404C Set

Comprises: **VS1013/01 Pulley Removal Plate**
                     VS1013/02 Pulley Installer
                     VS1013/03 Holding Tool

Fiesta/Courier (-02) 1.25/1.4 – uses VS1013/02 Installer only
Puma 1.4/1.6 (-98) and 1.7(-02) uses Complete VS1013 Set

On the above applications specialised tools are required to remove and/ or install the crankshaft pulley.
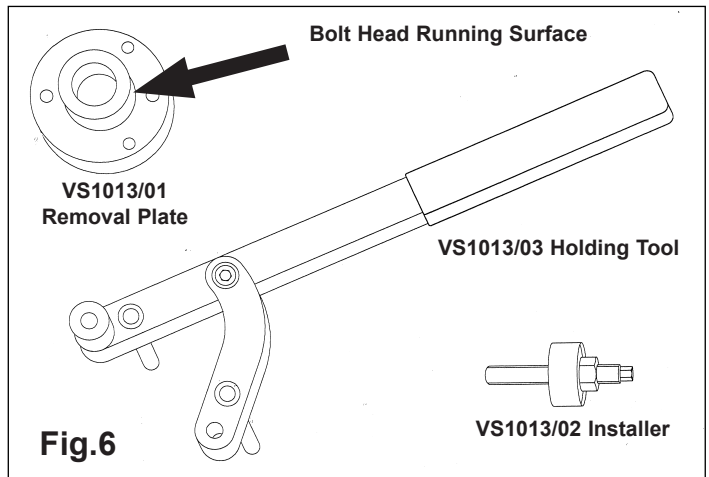
Fig.6

VS1013/01 Crank Pulley Removal Plate
VS1013/01 Removal Plate is used in conjunction with VS1013/03 Holding Tool to remove crank pulley. (Fig.6).

The Removal Plate is bolted onto the pulley and is subsequently prevented from rotating by Holding Tool VS1013/03. As the pulley centre bolt is unscrewed it reacts on the Removal Plate to withdraw the pulley off the crankshaft.

Lubricate the 'bolthead running surface' of VS1013/01 Removal Plate and bolt it onto the pulley (2 bolts) with the running surface against the domed head of the pulley centre bolt.
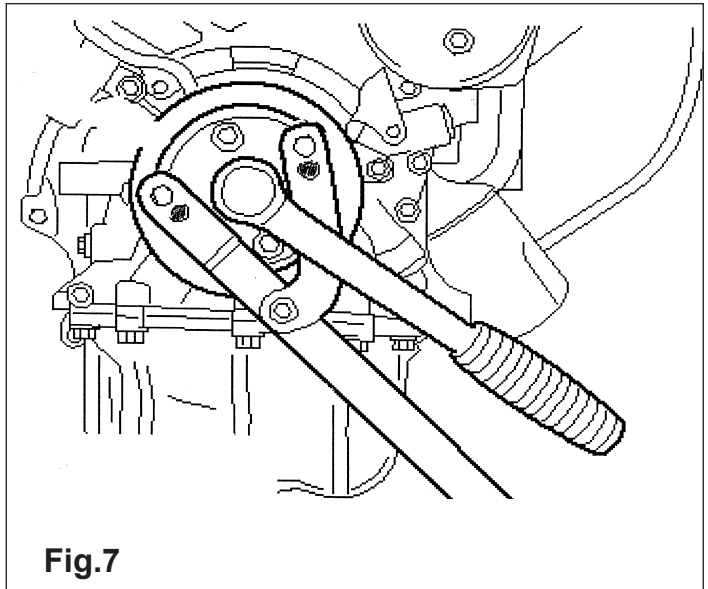

Fig.7

VS1013/03 Holding Tool
Locate the two pegs of VS1013/03 Holding Tool in to the remaining two holes in the VS1013/01 Removal Plate and use it to counter-hold the plate and pulley to prevent turning whilst unscrewing the pulley centre bolt. As the bolt is unscrewed it pushes the Removal Plate forward and this in turn extracts the pulley off its shaft. (Fig. 7).

On some later engines VS1013/03 Holding Tool can be used without the removal plate. Use the end holes of the Holding Tool and bolt it directly on to the pulley.
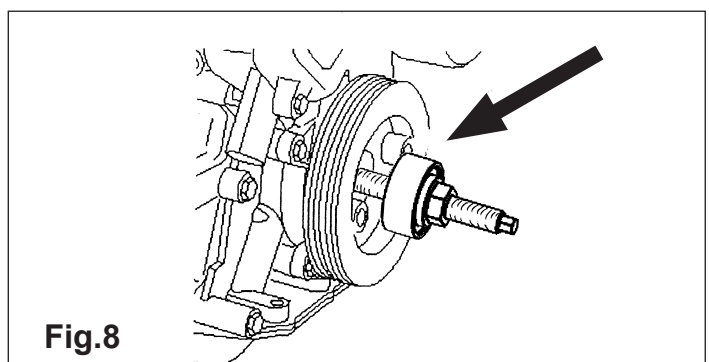

Fig.8

VS1013/02 Crank Pulley Installer

Replacing the crankshaft pulley on certain Fiesta and Puma engines requires specialised Installer VS1013/02 – see application chart.

IMPORTANT: A new pulley centre bolt is always required.
The pulley **MUST NOT** be pressed on using the centre bolt as this results in the torque specification for the bolt being achieved before the pulley is fully installed. Use VS1013/02 Installer to press the pulley fully onto the shaft and then fit the new centre bolt.

Place the pulley on shaft and screw the Installer Centre Screw into the shaft thread. Screw on the Force Nut Assembly and holding the end of the Centre Screw with a socket, turn the Force Nut to install the pulley. (Fig. 8).

Remove the VS1013/02 and install new pulley bolt to manufacturers specified torque / angle.

Fig.9

CASTILLATED SLOTS OF VS4736 MATCH 3 SLOTS IN PULLEY
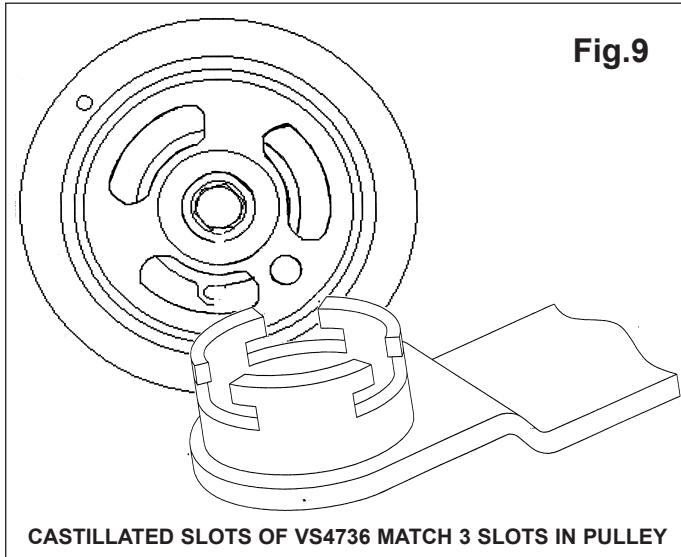
4.4.3 VS4736 Crankshaft Pulley Holding Tool
Associated Tool – not in VS4404C Set.

Focus / C-Max (03 - 08) 1.8 / 2.0, Mondeo (00-07)1.8 / 2.0, S-Max/ Galaxy 2.0 16v. CHAIN engines

VS4736 Holding Tool locates into the slots in the crankshaft pulley to counter-hold it whilst the pulley bolt is released or tightened. (Fig.9).

The crankshaft pulley and crank position rotor are combined. The pulley is secured to the crankshaft by contact pressure of its centre bolt, and is located in its correct position by means of an M6 bolt.

IMPORTANT: The M6 bolt **MUST NOT** be used to counter-hold the pulley whist tightening the centre bolt a damage to the timing cover will result.

The centre bolt washer must be a minimum of 5.5mm thick or a friction washer must be used. Install new pulley bolt to manufacturers specified torque / angle.

VS4404C | Issue No:1 - 23/07/08