

SEALEY Professional TOOLS

AUTO SERVICE LINE

Instructions for:

DIESEL ENGINE SETTING/LOCKING TOOL KIT - PSA HDI

Model No: **VS4820**

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

VS4820 Setting/Locking Tool Kit for PSA HDi common rail diesels covers timing belt replacement applications on 1.4, 1.6, 2.0 and 2.2HDI engines - DV4, DV6, DW10 and DW12.

2.2 Applications

CITROËN / PEUGEOT DV4, DV6, DW10 & DW12 HDi Diesel engines in:
CITROËN

Xsara/Picasso, C2, C3, C4, C5, Xantia, Evasion/Synergie, Berlingo, Dispatch/Jumpy & Relay/Jumper.

PEUGEOT

206, 306, 307, 406/Coupe, 607, 807, Expert, Partner & Boxer.

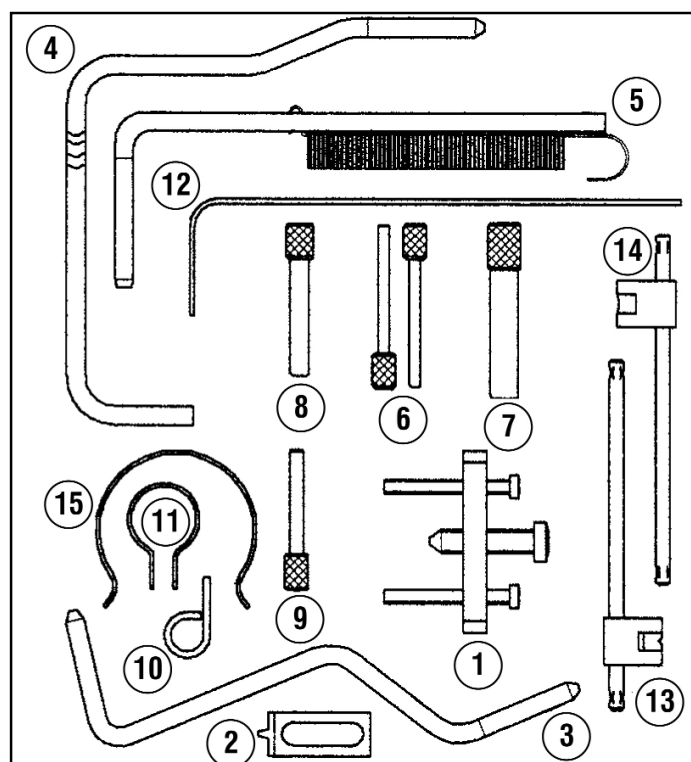
Engine Codes:

DV4TD (8HW/8HX/8HZ),	DV4TED4 (8HV/8HY),
DV6TED4 (9HX/9HY/9HZ),	DW10TD (RHY),
DW10ATED/L3/L4 (RHS/RHW/RHZ),	DW10BTED4/L3 (RHR/RHX),
DW10UTD (RHV),	DW12ATED (4HW/4HX),
DW12UTD (4HY)	

FIAT Ulysse, Scudo and Ducato models are also fitted with 2.0 and 2.2HDI engines under JTD reference. The range of timing tools in Kit VS4820 will also be applicable to these engines.

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| 5 | VS1210/P9 | Flywheel Locking Pin |
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4. APPLICATIONS TO TOOL SELECTION GUIDE

Models (Year) / Engine codes

CITROËN

1.4Hdi & 1.6Hdi

Xsara (02-04), C2 (03-06)

C3 (02-06), C4 (04-06)

C5 (04-06)

DV4TD, DV4TED4

(8HV/8HW/8HX/8HY/8HZ)

DV6TED4, DV6ATED4

(9HX/9HY/9HZ)

ApplicationTool

Crankshaft

Pulley RemovalLocking Pin VS4735/P16

FlywheelLocking Pin VS4735/P15

CamshaftLocking Pin VS4735/P17

HP PumpLocking Pin VS4735/P15

Models (Year) / Engine codes

2.0Hdi (Adjustable Camshaft Sprocket)

Xsara/Picasso (99-01), Xantia (98-01)

C5 (00-01), Evasion/Synergie (99-02),

Berlingo (99-01),

Dispatch/Jumpy (99-06),

Relay/Jumper (01-06)

DW10TD, DW10ATED, DW10ATD, DW10ATED4, DW10BTED/L3

DW10ATED/L3, DW10UTD (RHS/RHV/RHW/RHX/RHY/RHZ)

ApplicationTool

Crankshaft

Pulley RemovalRemover VS1210/01

.....Flywheel Holding Tool VS1286

FlywheelLocking Pin VS125/C6

.....Locking Pin VS125/C8

(use C6 or C8 Pin to provide best access position)

.....Locking Pin(Dual Mass) VS1210/P9

CamshaftLocking Pin VS125/P4

Timing Belt

TensioningAdjusters VS1210/02 or VS1210/03

RetentionRetaining Clip VS1210/04

Models (Year) / Engine codes

2.0Hdi (Adjustable Crankshaft Gear)

Xsara/Picasso (01-06), C5 (01-04),

Berlingo (01-06),

Dispatch/Jumpy (01-06)

DW10TD, DW10ATED, DW10ATED4 (RHS/RHW/RHY/RHZ)

ApplicationTool

Crankshaft

Pulley RemovalRemover VS1210/01

.....Flywheel Holding Tool VS1286

Crank Gear Positioning

.....Positioning Tool VS4820/P18

FlywheelLocking Pin VS125/C6

.....Locking Pin VS125/C8

(use C6 or C8 Pin to provide best access position)

.....Locking Pin(Dual Mass) VS1210/P9

CamshaftLocking Pin VS125/P4

Timing Belt

TensioningAdjusters VS1210/02 or VS1210/03

RetentionRetaining Clip VS1210/04

Models (Year) / Engine codes

2.0Hdi (Adjustable Crankshaft Gear)

C4 (04-06), C5 (04-06)

DW10BTED4 (RHR)

ApplicationTool

Crankshaft

Reluctor RemovalRemover VS1210/01

Pulley RemovalFlywheel Holding Tool VS1286

FlywheelLocking Pin (Dual Mass) VS1210/P9

Crank Gear Positioning

.....Positioning Tool VS4821

CamshaftLocking Pin VS125/P4

Timing BeltTensioner Locking Pin VS125/T5

Models (Year) / Engine codes

2.2Hdi

C5 (00-04)

Relay/Jumper (02-06)

DW12ATED, DW12UTED (4HX/4HY)

ApplicationTool

Crankshaft

Pulley RemovalFlywheel Holding Tool VS1286

FlywheelLocking Pin (Dual Mass) VS1210/P9

CamshaftLocking Pin VS125/P4

Timing Belt

TensioningAdjusters VS1210/02 or VS1210/03

RetentionRetaining Clip VS1210/04

Models (Year) / Engine codes

PEUGEOT

1.4Hdi

206 (01-06), 307 (01-06)

DV4TD (8HX/8HZ)

ApplicationTool

Crankshaft

Pulley RemovalLocking Pin VS4735/P16

FlywheelLocking Pin VS4735/P15

CamshaftLocking Pin VS4735/P17

HP PumpLocking Pin VS4735/P15

Models (Year) / Engine codes

2.0Hdi

206 (99-06), 306 (99-02), 307 (01-06), 406 (98-04), 607 (00-06),

806 (99-02), 807 (02-06), Partner (99-06), Expert (99-06),

Boxer (02-06)

DW10TD, DW10ATED, DW10ATED4, DW10ATED4/L4, DW10UTD
(RHS/RHV/RHW/RHY/RHZ)

ApplicationTool

Crankshaft

Pulley RemovalRemover VS1210/01

.....Flywheel Holding Tool VS1286

FlywheelLocking Pin VS125/C6

CamshaftLocking Pin VS125/P4

Timing Belt

TensioningAdjusters VS1210/02 or VS1210/03

RetentionRetaining Clip VS1210/04

Models (Year) / Engine codes

2.2Hdi

406/Coupe (00-04), 607 (00-06),

807 (02-06), Boxer (02-06)

DW12ATED, DW12ATED4/L4 (4HW/4HX/4HZ)

ApplicationTool

Crankshaft

Pulley RemovalFlywheel Holding Tool VS1286

FlywheelLocking Pin (Dual Mass) VS1210/P9

CamshaftLocking Pin VS125/P4

Timing Belt

TensioningAdjusters VS1210/02 or VS1210/03

RetentionRetaining Clip VS1210/04

5. INSTRUCTIONS

VS4820 Setting/Locking Tool Kit

Comprises:- For 1.4 & 1.6Hdi engines

- VS4735/P15 HP Pump & Crankshaft Locking Pin (2 per kit)
- VS4735/P16 Flywheel Locking Pin
- VS4735/P17 Camshaft Locking Pin

For 2.0 & 2.2Hdi engines

- VS1210/01 Crankshaft Pulley Remover
- VS1286 Flywheel Holding Tool (Pulley removal)
- VS125/C6 Flywheel Locking Pin
- VS125/C8 Flywheel Locking Pin
- VS1210/P9 Flywheel Locking Pin (Dual Mass)
- VS125/P4 Camshaft Locking Pin
- VS125/T5 Tensioner Locking Pin
- VS4821 Crank Gear Positioning Tool
- VS4820/P18 Crank Gear Positioning Tool
- VS1210/02 Tensioner Adjuster
- VS1210/03 Tensioner Adjuster
- VS1210/04 Timing Belt Retaining Clip

1.4 and 1.6Hdi engines use the same Locking Pins to retain engine timing position - see Applications/Tool Section Guide.

PSA 1.4 and 1.6 Hdi diesel engines are also fitted in Ford models under Duratorq (TDCi) identification.

The original variants of the 2.0Hdi engines use an adjustable camshaft sprocket to achieve final timing position during belt fitting/tensioning.

In 2001 the use of an adjustable crankshaft gear position was introduced and required additional tools - see Applications/Tool Section Guide.

The 2.2Hdi engine broadly utilises the same tools as the 2.0Hdi.

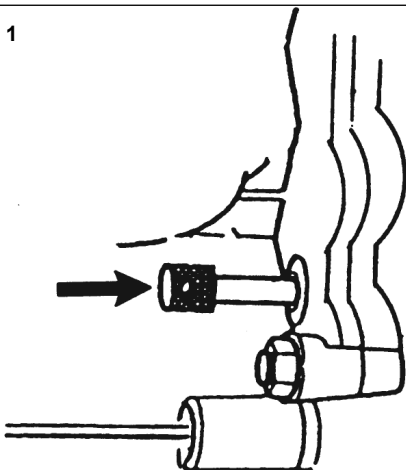
Engine variants and introduction times vary between Citroen and Peugeot models.

5.1 1.4Hdi and 1.6Hdi engines

Refer to Applications/Tool Selection Guide.

Timing belt replacement on these engines requires the use of 4 Locking Pins.

Fig. 1



VS4735/P16 Flywheel Locking Pin

Remove the RH road wheel and inner wing cover. Move the electrical harness away from the belt upper cover and remove auxiliary belt, upper timing belt cover and the blanking plug in the bell housing where Locking Pin VS4735/P16 is to be inserted.

Rotate the crankshaft until VS4735/P16 can be inserted into one of the slots in the flywheel to 'lock' the engine (Fig. 1).

Remove the crankshaft pulley, lower timing belt cover, crank position sensor, (check that the magnetic track is not damaged) and belt guide angle bracket.

WARNING! Do not touch the magnetic track (sensor ring).

Re-fit the crankshaft pulley bolt (to facilitate engine turning), and remove Locking Pin VS4735/P16.

1.4Hdi

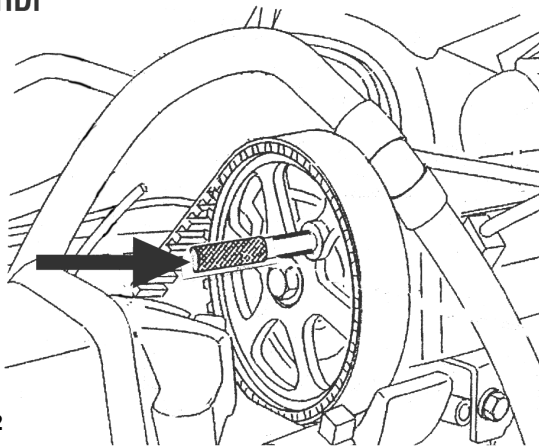
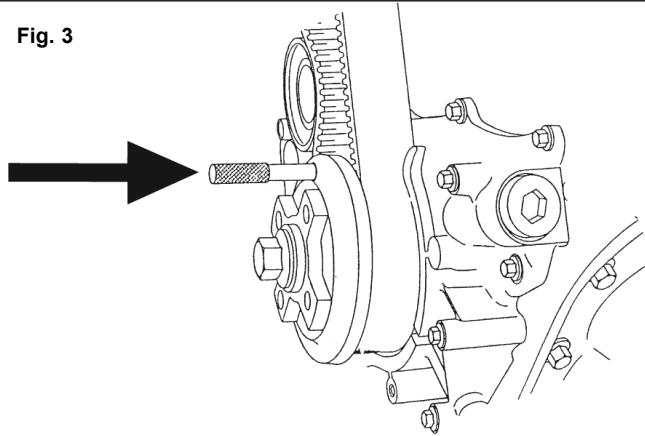


Fig. 2

VS4735/P17 Camshaft Locking Pin

Turn the engine until the camshaft sprocket timing holes align, and insert Locking Pin VS4735/P17 (Fig. 2).

Fig. 3



VS4735/P15 Crankshaft and HP Pump Sprocket Locking Pins (2 in set)

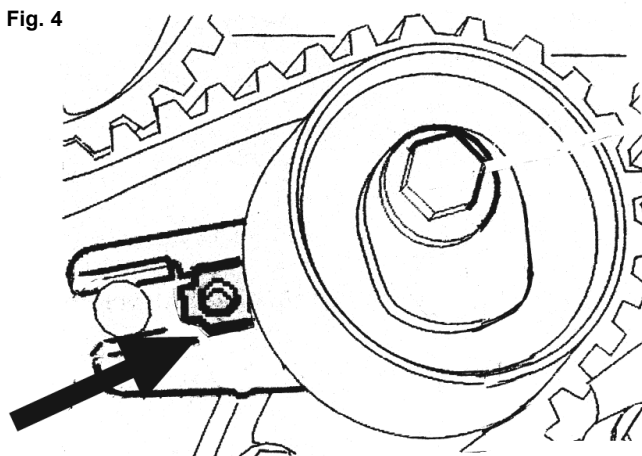
Check that the crankshaft key is in the 11-0'clock position and insert Locking Pin VS4735/P15 to confirm correct crankshaft position (Fig. 3).

One of the VS4735/P15 Locking Pin is used to "lock" the crankshaft and the other one "locks" the HP pump sprocket. Check the HP pump alignment via holes in the pump sprocket. If there is not a corresponding hole in the pump bracket to the hole in the sprocket, then align by positioning the holes in the sprocket vertically.

Support the engine to allow removal of the RH engine mounting/bracket, release the tensioner and remove the old timing belt.

Ensure the camshaft sprocket and crankshaft are locked in timing position with Pins VS4735/P17 and VS4735/P15 respectively. Ensure the HP pump is aligned correctly.

Fig. 4



Fit the new timing belt and install the engine mounting/bracket. Apply tension to the belt by turning the tensioner anti-clockwise until the pointer is positioned between the sides of the window (Fig. 4). Re-fit crank position sensor and belt guide angle bracket.

WARNING! Do not touch the magnetic track (sensor ring).

Remove the Locking Pins.

Carefully rotate the crankshaft 10 times **clockwise**.

Check engine timing by ensuring that the camshaft and crankshaft locking pins can be inserted and that the HP pump sprocket is correctly aligned.

Remove all Locking Pins and check the tensioner pointer is positioned within the window.

Insert Locking Pin VS4735/P16 into the flywheel and fit the crankshaft pulley using a new centre bolt.

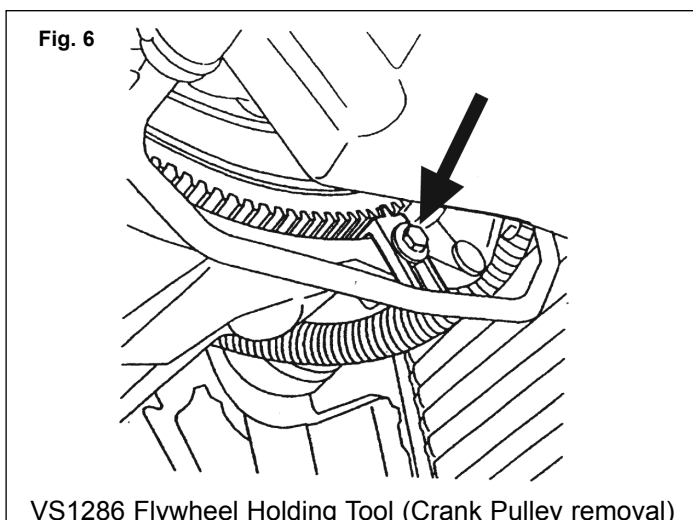
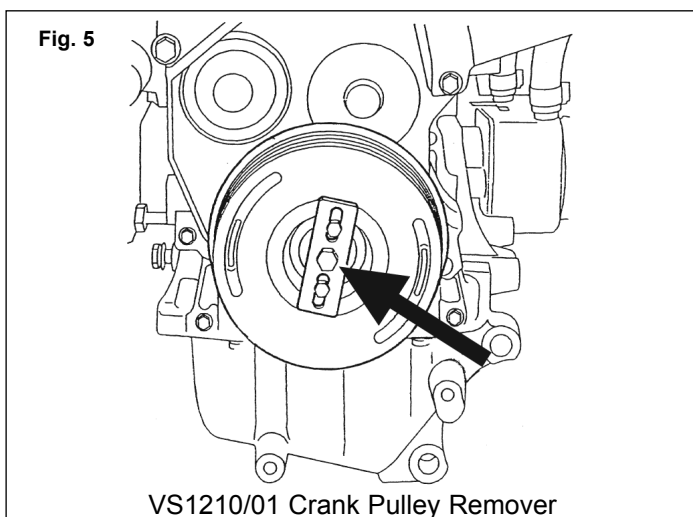
5.2 2.0HDi and 2.2HDi engines

Refer to Applications/Tool Selection Guide.

5.2.1 Crankshaft/Flywheel

These HDi engines require the use of a specialised remover to extract the crankshaft pulley to allow the timing belt to be removed.

Also, as the flywheel timing hole can be difficult to access, 3 x "Shaped" Flywheel Locking Pins are included in the kit, (including the Locking Pin required for dual mass flywheels). Two tools are provided to cover the adjustable crankshaft gear position, introduced on some variants in 2001, and the kit contains two Tensioner Adjusters, covering the sizes of square drive on the belt tensioner, likely to be encountered on these 2.0 and 2.2HDi diesels.



VS1286 Flywheel Holding Tool (Crank Pulley removal)

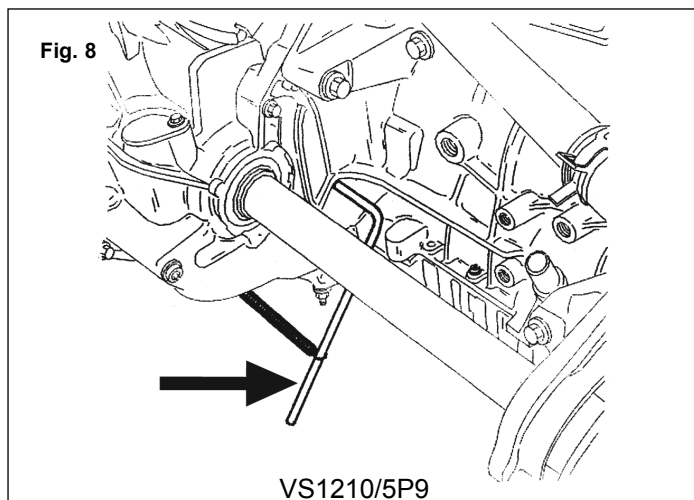
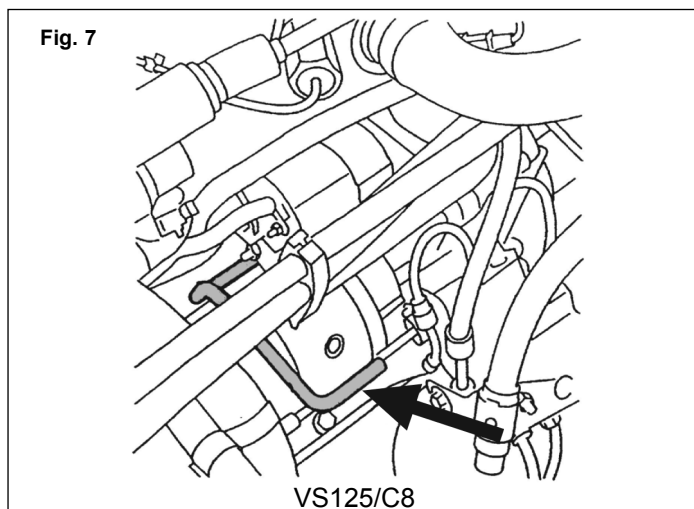
VS1210/01 Crankshaft Pulley Remover

In order to remove the timing belt, the crankshaft pulley must be removed. VS1286 Holding Tool is used to 'lock' the flywheel whilst releasing the pulley bolt. Once the bolt is released, the tool is removed. Remove the clutch housing bottom plate to give access for the Holding Tool. VS1286 is also fitted when refitting the pulley bolt (Fig. 6).

IMPORTANT: Locking Pins must NOT be used to hold the crankshaft whilst releasing or tightening the pulley bolt. Locking Pins are for retention of timing position only.

On most 2.0HDi engines, once the pulley bolt is removed the pulley must be extracted using VS1210/01 Remover (Fig. 5).

Support the engine and remove the right-hand mounting/bracket to enable the timing covers to be removed. On HDi engines it will be necessary to disconnect and seal off the fuel pipes.



VS125/C6, VS125/C8 and VS1210/P9 Flywheel TDC Locking Pins.

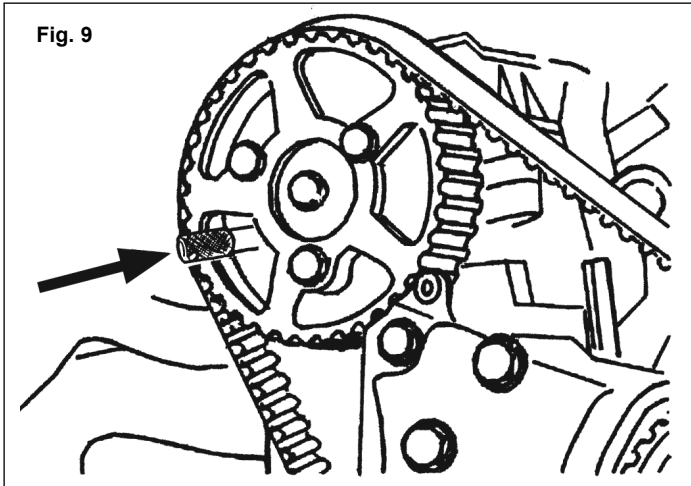
Turn the crankshaft to its timed position and 'lock' by inserting the TDC Pin into the flywheel datum hole. Often, the starter motor or other components which are not usually removed, restrict access. The special shape of VS125/C6 and VS125/C8 allows their use around these obstructions (Fig. 7).

VS1210/P9 Locking Pin is used for dual mass flywheel applications and is held in place by attaching its retaining spring to a suitable bolt head (Fig. 8).

5.2.2 Adjustable Camshaft Sprocket or Adjustable Crankshaft Gear

Refer to Applications/Tool Selection Guide.

Fig. 9



VS125/P4 Camshaft Locking Pin

All 2.0HDI and 2.2HDI diesels use the VS125/P4 Camshaft Locking Pin, which is located through slots or a hole in the camshaft sprocket, and into a datum hole in the cylinder head to position the camshaft in 'timed' position (Fig. 9).

Adjustable Camshaft Sprocket

All 2.0 & 2.2HDI engines up to 2001 and certain variants after 2001, have an adjustable camshaft sprocket. Usually the sprocket is fixed to a sprocket carrier by 3 bolts through slotted holes in the sprocket. VS125/P4 Pin locates through a timing hole in the carrier and into a datum hole in the cylinder head to retain camshaft position. Once the Locking Pin is inserted the 3 x bolts can be slackened to finger-tight, prior to the old belt being removed.

Turn the camshaft sprocket fully **clockwise** within the slotted holes. The bolts should be sufficiently tight to offer a slight resistance to the sprocket turning.

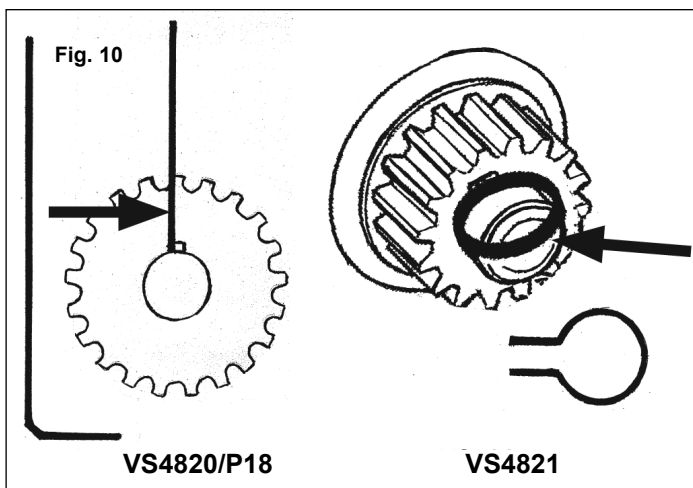
When fitting the new belt, place it on the sprocket teeth and engage it into the teeth by turning the sprocket slightly **anti-clockwise**.

IMPORTANT: Angular movement of the sprocket **MUST NOT** exceed one tooth space.

Fit the timing belt and tensioned to specification. As the belt is tensioned the camshaft sprocket will turn slightly in the slotted holes but must not reach the ends of the slots.

Tighten the sprocket bolts.

Adjustable crankshaft gear



VS4820/P18 and VS4821 Crankshaft Gear Positioning Tools

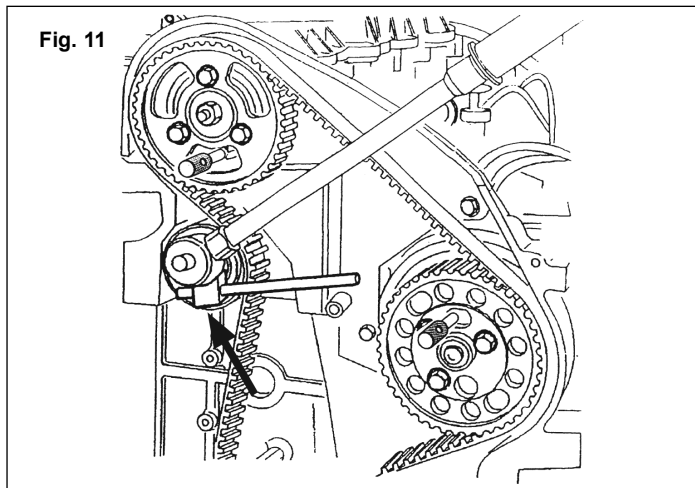
When the flywheel and camshaft locking pins have been inserted and the engine is "locked" in the correct timed position, the belt tensioner can be released and the old belt removed.

At this point, the Crankshaft Gear Positioning Tools are inserted into position, at the crankshaft key (Fig. 10).

VS4820/P18 Positioning Tool - is inserted at the side of the crankshaft key, prior to the new belt being fitted. The timing belt is fitted and the VS4820/P18 is removed. The belt is then tensioned to specification.

VS4821 Positioning Tool - on engines requiring the use of VS4821 Tool the crankshaft gear is centralised on the key by inserting VS4821 in position both sides of the crankshaft key. The timing belt is fitted and the VS4821 is removed. The belt is then tensioned to specification.

Fig. 11

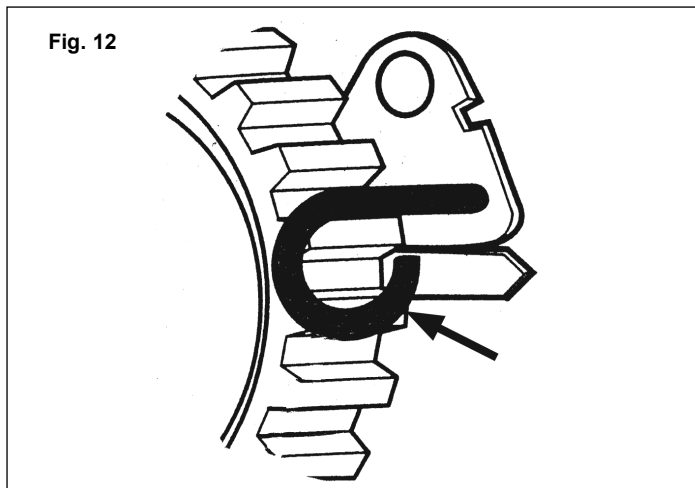


5.2.3 Belt Tensioning

VS1210/02 and VS1210/03 Tensioner Adjusters

These Belt Tensioner Adjusters locate in to the square drive in the tensioner so it can be turned to release or apply tension to the timing belt. The two sizes provided will cover the HDi range (Fig. 11).

Fig. 12



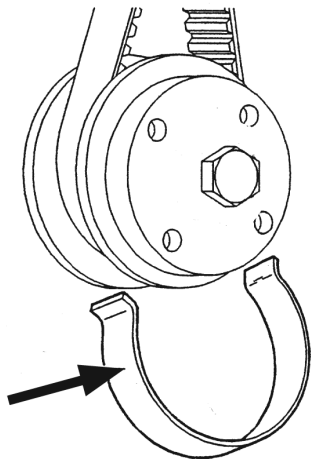
VS125/T5 Tensioner Locking Pin

On DW10BTED4 engines the belt tensioner does not have a square drive insert, it is adjusted using a standard allen key. Belt tension is by ensuring the pointer aligns with a notch in the baseplate. When releasing tension off the old belt the tensioner is "locked" back away from the belt using VS125/T5 Locking Pin (Fig. 12).

5.2.4 Fitting New Belt / Tensioning Procedure

Before fitting the new belt ensure the flywheel and camshaft sprocket locking pins are in place and if an adjustable camshaft sprocket is fitted, loosen, to finger tight, the 3 bolts retaining the camshaft sprocket to allow them to be turned fully clockwise to the end of their slotted holes.

Fig. 13



VS1210/04 Timing Belt Retaining Clip

Fit the new belt to the crankshaft gear and retain in place with VS1210/04 Belt Clip. Fit belt in an **anti-clockwise** direction to the tensioner roller, injection pump sprocket, camshaft sprocket, water pump and tensioner and then remove VS1210/04 Belt Clip (Fig. 13).

Use VS1210/02 or VS1210/03 Tensioner Adjuster to apply initial tension to the belt. Attach a suitable Tension Tester and turn the tensioner **anti-clockwise** to achieve correct belt tension.

IMPORTANT: At this stage the 3 bolts of the adjustable camshaft sprocket **MUST NOT** be at the end of their slotted holes. Tighten these bolts to specified torque.

Remove all locking pins and turn the engine over, by hand, a few times in the normal direction of rotation, returning to timing position and re-fitting all locking pins.

IMPORTANT: Never allow the crankshaft to be turned in the reverse direction.

It is good practice to confirm the timing is correct by finally adjusting the engine to timed position and refitting the timing tools to check the timing position.

If it is not possible to locate the Locking Pins then it will be necessary to carry out the timing/tensioning procedure again.



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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