Instructions for:

**DIESEL ENGINE SETTING/LOCKING KIT**

**TDV6**

Model No: VS4965

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### 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.

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### 2. INTRODUCTION / APPLICATIONS

Covers all variants of the TDV6 Quad-Cam common rail diesel engine found in Land Rover, Jaguar and PSA (Citroen/Peugeot) vehicles. These engines drive the exhaust camshaft from the crankshaft which in turn are linked by chains to the inlet camshaft. The ‘only’ kit currently to handle all versions including automatic transmission variants. Includes warning tag.

**LAND ROVER, JAGUAR & PSA (Citroen/Peugeot) 2.7 V6 (TDV6)**

Quad Cam Diesel engines in:

- **LAND ROVER**
  - Range Rover Sport
  - Discovery 3
- **JAGUAR**
  - S-Type
  - XJ Series
- **PSA – Citroen/Peugeot**
  - **CITROEN**
    - C6
  - **PEUGEOT**
    - 407 / Coupe
    - 607

**Engine codes:**

- 276DT / DT17TED4 (UHZ) (TDV6) engines.

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4. INSTRUCTIONS

The TDV6 diesel engines fitted in Land Rover, Jaguar and PSA models are ‘Quad Cam’. Common Rail diesels with a front timing belt driving the exhaust camshafts from the crankshaft. Chains connect the inlet camshaft to the exhaust camshaft in each bank. A separate belt at the rear of the engine, operates the HP pump from the camshaft (Note: the HP pump does not require timing).

The timing belt replacement procedure is basically the same for all vehicles. However it should be noted that two Flywheel Locking Tools are required for Land Rover and Jaguar (one for Automatic and one for Manual transmissions) and that PSA models also require a different Flywheel Tool from the ones used on L-R and Jaguar.

The Camshaft Locking Pins are common to all these applications, but additionally, a Timing Check Pin is used on Land Rover and Jaguar timing procedures.

It will be necessary to remove / dismantle a number of components to gain access to the timing belt area, including the need to drain the coolant, remove intercooler, air filter and engine under-shield. Remove Right-Hand road wheel and splash shield. Support the engine and remove upper Right-Hand engine mounting/support.

Remove the viscous fan, crankshaft pulley, auxiliary belt/tensioner, and coolant pump pulley.

NOTE: PSA applications use VS4965C9 Coolant Pump Locking Pin when removing the Pulley. Align one of the three holes in the pulley with the hole in the coolant pump body – insert VS4965C9 Locking Pin to fix position, and remove the pulley. (Fig.1).

Remove timing belt covers and starter motor.

VS4965 V6 Diesel Engine Setting / Locking Tool Kit Comprises:

VS4965L1 Camshaft Locking Pins (Pair) - (all applications)
VS4965L2 Camshaft Timing Checking Pin (L – R / Jaguar)
VS4965C9 Coolant Pump Locking Pin (PSA)
VS4966 Flywheel Locking Tool (Automatic Transmission L – R / Jaguar)
VS4967 Flywheel Locking Tool (Manual Transmission L – R / Jaguar)
VS4968 Flywheel Locking Tool (PSA)
VS1210/04 Timing Belt Retaining Clip (all applications)

4.1 Camshaft timing

Remove the timing hole grommet from the engine block to allow for insertion of the appropriate Flywheel Locking Tool. (Fig.2).

VS4966 – Automatic Transmission – Land Rover / Jaguar
VS4967 – Manual Transmission – Land Rover / Jaguar
VS4968 – PSA (Citroen / Peugeot)

Turn the crankshaft clockwise to align the datum hole in the flywheel within the timing hole.

Check that the timing holes in the camshaft sprockets are aligned with the datum holes behind them. If they are not aligned, turn the crankshaft one turn clockwise.

Insert the appropriate Flywheel Locking Tool into the timing hole so that the ‘pin’ of the tool locates into the datum hole in the flywheel in order to ‘lock’ the flywheel in ‘timed’ position.

NOTE: VS4967 Flywheel Locking Pin is retained in correct orientation by fixing the Tool to the starter motor bolt position.
4.1.1 VS4965L1 Camshaft Locking Pins (Pair)
Insert the VS4965L1 Locking Pins into the timing holes in the exhaust camshaft sprockets and through into the rear datum holes to ‘lock’ the camshafts. (Fig. 3 & 4)

WARNING: VS4965L1 Pins MUST NOT be used to counter-hold the sprockets when releasing/tightening the sprocket bolts. Use a suitable Sprocket Holding Tool.
Counter-hold sprockets with a suitable Holding Tool whilst slackening the 3 x bolts on each sprocket.
Remove and discard the belt tensioner pulley/bolt and the timing belt.
Check that the idler pulleys and coolant pump rotate freely and check for any oil and coolant leaks.

4.2 New timing Belt Installation
Install a new belt tensioner and bolt NOTE: Tighten tensioner bolt finger-tight only at this stage.
Turn both camshaft sprockets fully clockwise in their slotted holes.

4.2.1 Fit a new timing belt in the following sequence:
Crankshaft Gear – retain belt in place on the gear using VS1210/04 Belt Retaining Clip. (Fig. 5).
Idler Pulley
left-Hand Camshaft Sprocket – ensure sprocket remains in the clockwise position.
Idler Pulley
Right-Hand Camshaft Sprocket - ensure sprocket remains in the clockwise position.
Belt Tensioner.

4.2.2 If necessary, turn the camshaft sprockets slightly anti-clockwise to fit belt (no more than one tooth). Ensure the timing belt is taut between sprockets.
Remove VS1210/04 Retaining Clip.

4.2.3 Unscrew the camshaft sprocket bolts (3 on each sprocket) to visually check that they are not at the end of the slotted holes. (Fig. 7). Counter-hold the camshaft sprockets using a suitable Holding Tool and tighten the sprocket bolts (3 on each sprocket).

4.2.4 Remove the VS4965L1 Camshaft Locking Pins and Flywheel Locking Tool.

4.2.5 Rotate the crankshaft slowly, by hand, 2 complete turns, in normal direction of rotation, and again align the datum hole in the flywheel into the timing hole.

4.2.6 Insert the Flywheel Locking Tool and the Camshaft Locking Pins to confirm that the correct timing of the engine has been established.

IMPORTANT: PSA detail use of the VS4965L1 Locking Pins inserted into the Left-Hand and Right-Hand sprockets in order to check the camshaft timing positions are correct.

4.2.7 Land Rover and Jaguar use one of the VS4965L1 Pins in the Left-Hand Sprocket (when viewed from the sprockets) and the VS4965L2 Timing Check Pin in the Right-Hand sprocket to determine that timing is correct.
If Locking Pins do not fit, repeat the timing belt replacement procedure.