

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.
- 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

Suitable for timing gear drive engines where the camshaft, crankshaft and auxiliary shafts are all linked by a series of inter-meshed helical gears. Supplied with comprehensive instructions and carry case.



Applications:

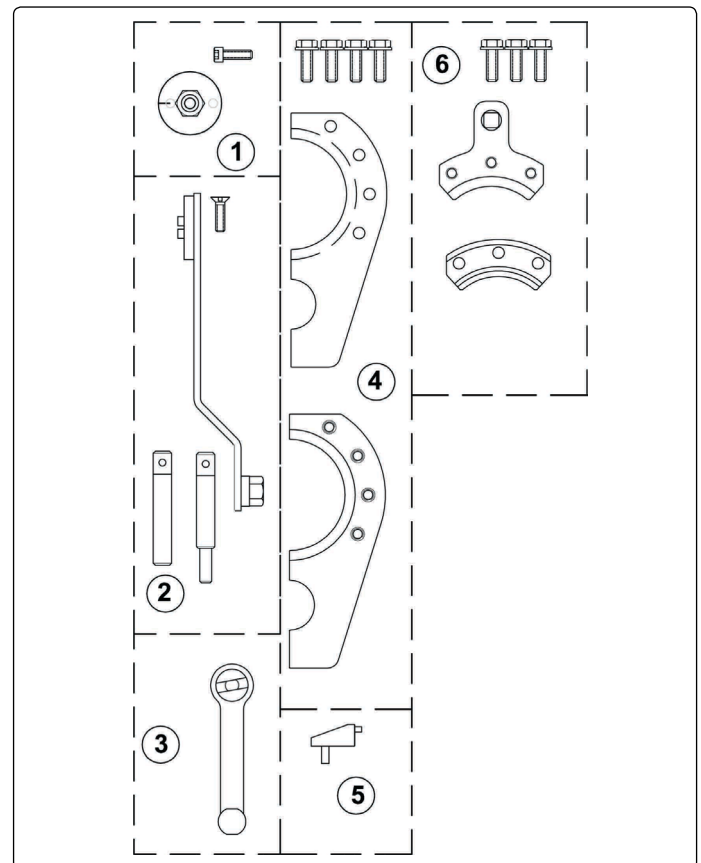
VW GROUP 2.5 TDi Pump Düse Diesel engine (GEAR) in:

VOLKSWAGEN:

Transporter 03-09
 Touareg 03-10

Engine Codes:

AXD, AXE, BAC, BLJ, BLK, BNZ, BPC, BPD and BPE.



Kit contents

Item	Part Number	Description
1	VS5031	Crankshaft TDC Position Tool
2	VS5032	Crankshaft Locking Tool
3	VS5033	Camshaft Locking Tool
4	VS5034	Camshaft Gear Clamp
5	VS5036	Eccentric Pin Holding Tool
6	VS5037	Camshaft Gear Adjuster
-	VS5035-84	Case + Insert

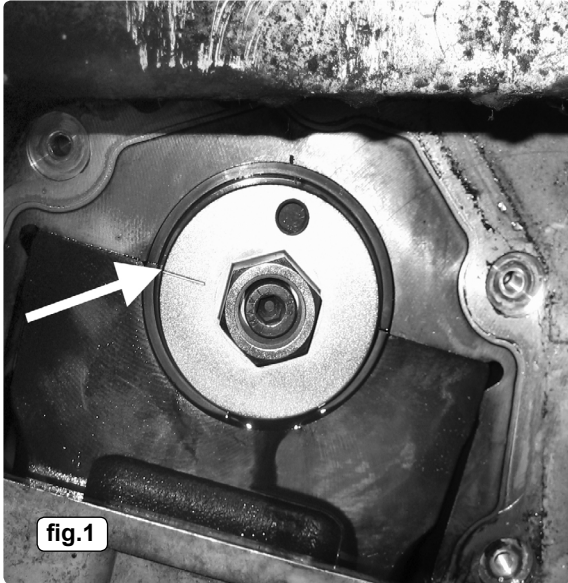
3. INSTRUCTIONS

Introduced in 2003, the 2,5L TDi Pump Düse engines utilise a helical-toothed spur gear set that drives the camshaft and all engine auxiliaries from the crankshaft. The engine fan is electrically driven.

NOTE: The tools in this timing kit are used in a specific sequence, and it will save time and make selection of the correct tools easier if the operator reads and becomes familiar with the timing procedure beforehand.

3.1. Checking the Valve Timing.

IMPORTANT: To check the valve timing, the crankshaft is positioned at TDC at cylinder number 1.



3.1.1. VS5031 Crankshaft TDC Position Tool.

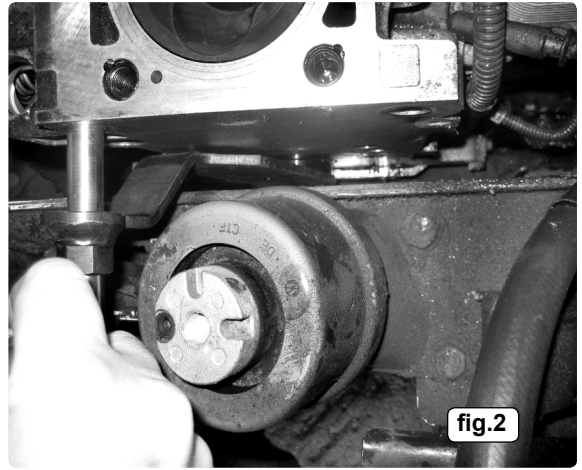
VS5031 is used to rotate the crankshaft to the timed position.

Position VS5031 Crankshaft TDC Position Tool onto the crankshaft (fig.1); turn the crankshaft in the direction of engine rotation aligning the marks on VS5031 and the sealing flange.

NOTE: The Crankshaft Locking Tool locates onto the crankshaft in only one position.

The crankshaft is now timed in the correct position with number 1 cylinder at TDC.

Remove VS5031 Position Tool

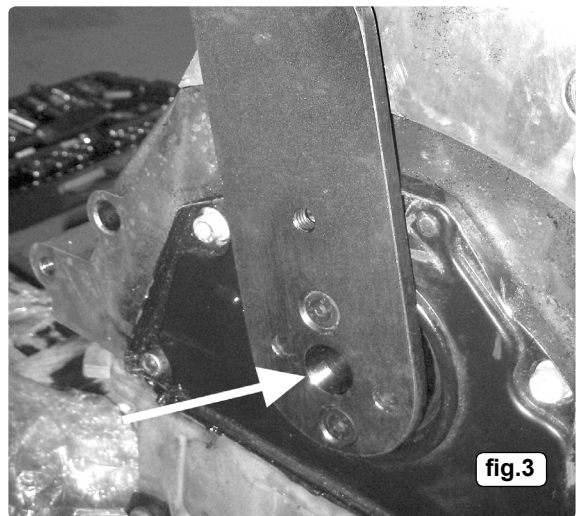


3.1.2. VS5032 Crankshaft Locking Tool.

VS5032 Locks the crankshaft in position with number 1 cylinder at TDC.

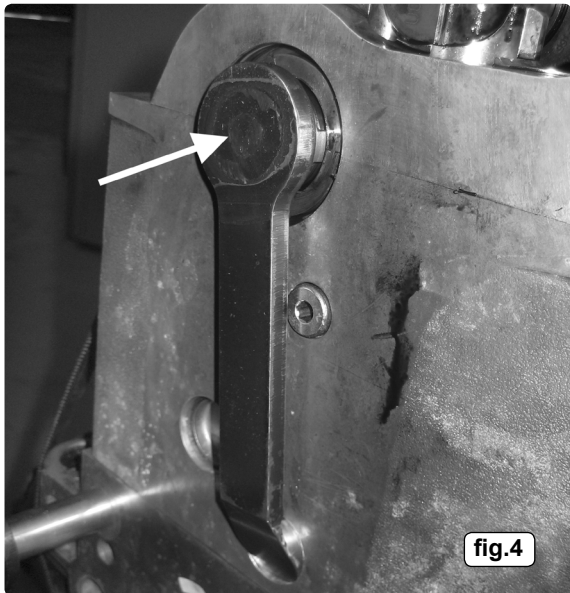
Fit VS5032 Crankshaft Locking Tool onto the crankshaft, at the same time engaging the clamp pin through the engine mounting in the cylinder block using the **stepped pin** (fig.2).

NOTE: When the engine is removed from the vehicle, or the engine mounting is removed, the alternative **straight pin** is positioned directly into the cylinder block.



3.1.3. Attach the Crankshaft Locking Tool onto the crankshaft with the screw provided (fig.3).

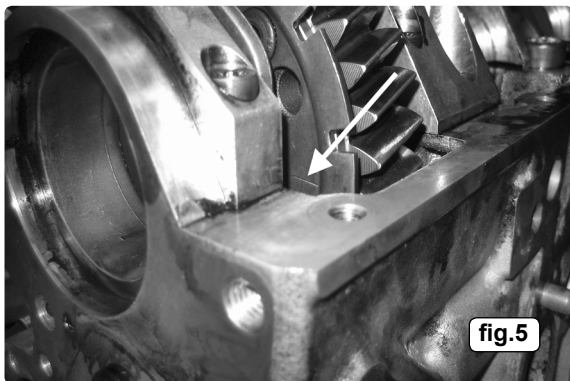
NOTE: The Crankshaft Locking Tool fits in only one position on the crankshaft. If it is not possible to fit the Locking Tool, re-fit VS5031 and turn the crankshaft one revolution, in the direction of engine rotation, until the marks on VS5031 and the sealing flange align again.



3.1.4. VS5033 Camshaft Locking Tool.

VS5032 is used to accurately align a datum slot, located in the end of the camshaft with a datum hole in the cylinder head, to hold the camshaft at the TDC position.

Fit the VS5033 Camshaft Locking Tool in position (fig.4).



3.1.5. Check the position of the camshaft gear.

The timing is correct when the marking arrow on the sender wheel is aligned with the upper edge of the cylinder head sealing surface as in fig.5.

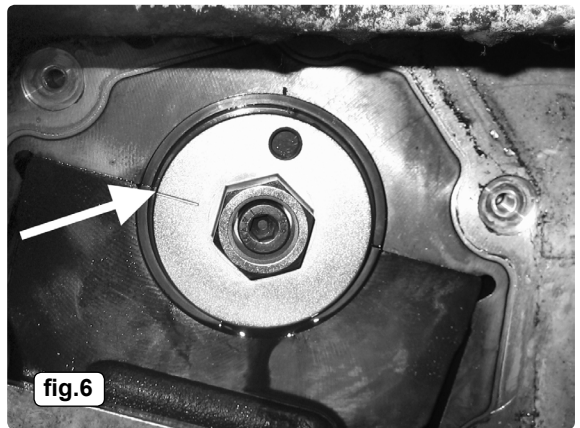
If the marking arrow does not align, adjustment of the valve timing will be necessary.

3.2. Adjusting the Valve Timing.

When adjusting the valve timing, removing and installing the cylinder head, removing and installing the camshafts, it is necessary to remove the camshaft drive gear

3.2.1. Removing camshaft drive gear

It will be necessary to remove the acoustic cover, cylinder head cover and the tandem pump.

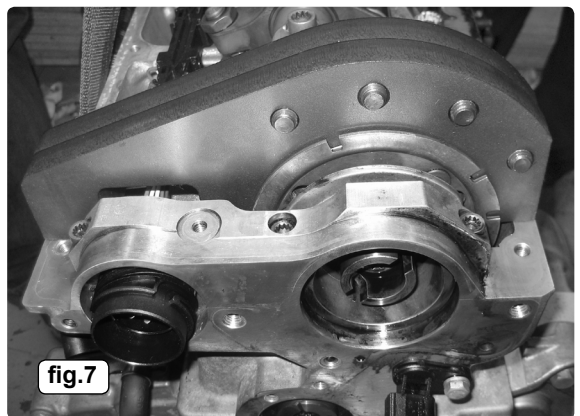


3.2.2. Position the crankshaft at TDC for cylinder number 1.

Position VS5031 Crankshaft TDC Position Tool onto the crankshaft (fig.6); turn the crankshaft in the direction of engine rotation aligning the marks on VS5031 and the sealing flange.

NOTE: The Crankshaft Locking Tool fits in only one position on the crankshaft.

The crankshaft is now timed in the correct position with number 1 cylinder at TDC.



3.2.3. VS5034 Camshaft Gear Clamp

VS5034 Camshaft Gear Clamp is used to support the camshaft gear to allow the camshaft gear fixing bolt to be removed.

3.2.4. Remove the outer bearing cap and position VS5034 Camshaft Gear Clamp onto the camshaft gear and tighten the four bolts to 40 Nm (fig.7).

3.2.5. Loosen the fixing bolt of the camshaft gear and remove with the tandem pump shaft.

3.2.6. Release the four bolts securing the Camshaft Gear Clamp and remove VS5034.

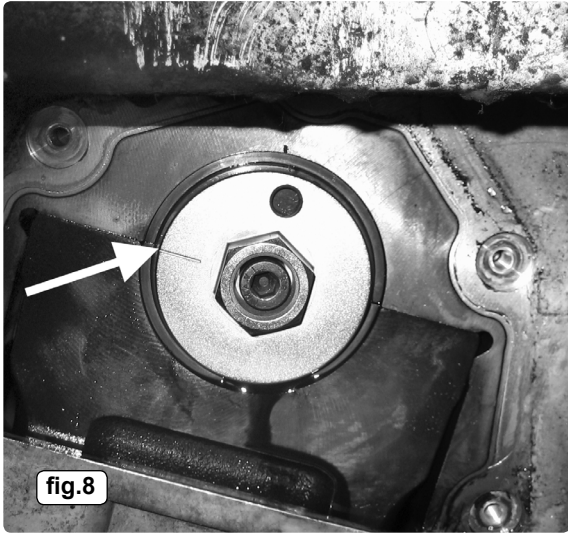
3.2.7. Remove the camshaft gear from the camshaft.

3.2.8. Unbolt the sealing cover from the eccentric pin, removing the securing bolt and pulling the eccentric pin out.

3.2.9. Remove the camshaft drive gear.

IMPORTANT: Care must be taken when removing the camshaft drive gear and the compensating link.

3.3. Installing Camshaft Drive Gear.

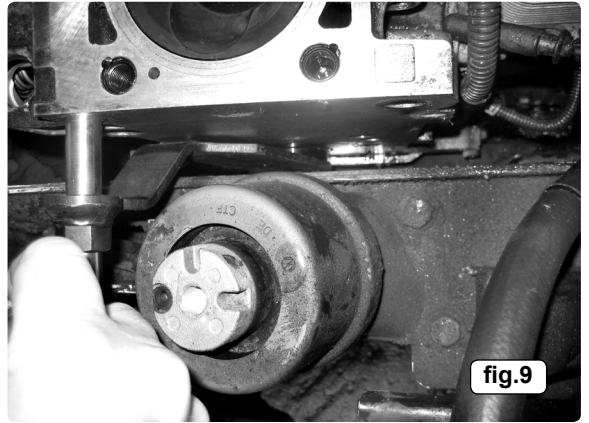


3.3.1. Position VS5031 Crankshaft TDC Position Tool onto the crankshaft (fig.8); turn the crankshaft in the direction of engine rotation aligning the marks on VS5031 and the sealing flange.

NOTE: The Crankshaft Locking Tool fits in only one position on the crankshaft.

The crankshaft is now timed in the correct position with number 1 cylinder at TDC.

3.3.2. Remove VS5031 Position Tool.

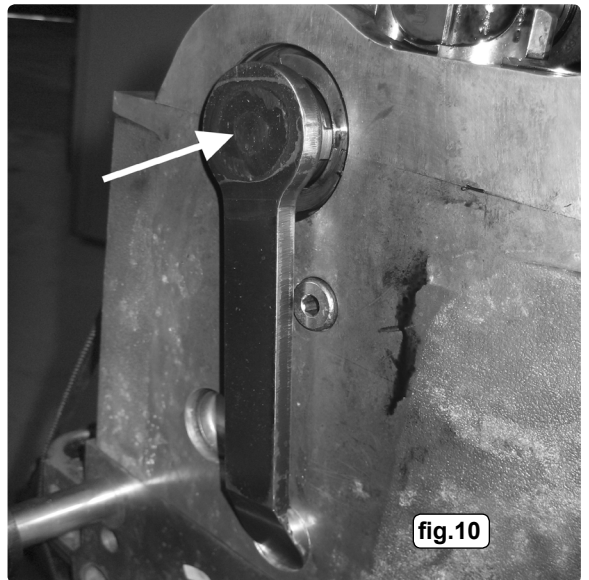


3.3.3. Fit VS5032 Crankshaft Locking Tool onto the crankshaft at the same time engaging the clamp pin through the engine mounting on the cylinder block using the **stepped pin** (fig.2).

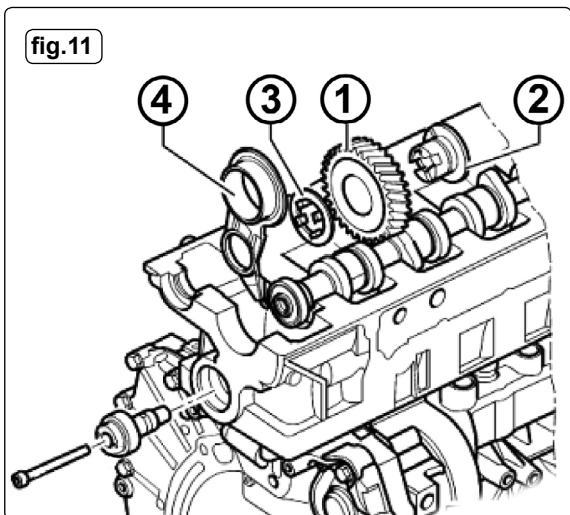
NOTE: When the engine is removed from the vehicle, or the engine mounting is removed, the alternative **straight pin** is positioned directly into the cylinder block.

3.3.4. Attach the Crankshaft Locking Tool onto the crankshaft with the screw provided.

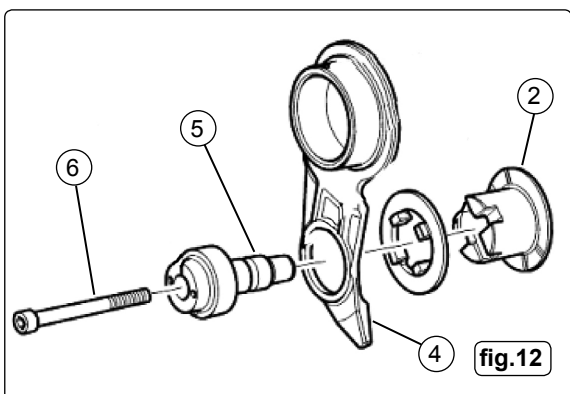
NOTE: The Crankshaft Locking Tool fits in only one position on the crankshaft. If it is not possible to fit the Locking Tool, re-fit VS5031 and turn the crankshaft one revolution, in the direction of engine rotation, until the marks on VS5031 and the sealing flange align again.



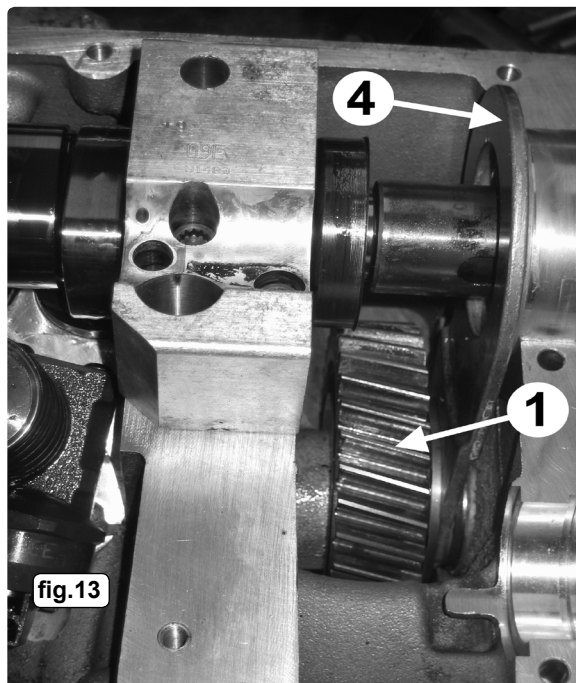
3.3.5. Fit VS5033 Camshaft Locking Tool in position (fig.10).



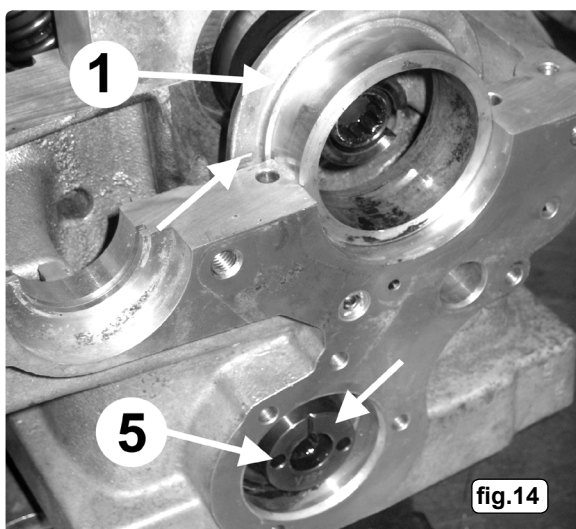
- 3.3.6. Install the camshaft drive gear (**fig.11.1**) onto the guide sleeve (**fig.11.2**) ensuring all surfaces of the guide sleeve are oiled.
- 3.3.7. Install the disc (**fig.11.3**) engaging the lugs in the grooves of the guide sleeve (**fig.11.2**).
- 3.3.8. Install the drive gear (**fig.11.1**) with disc (**fig.11.3**) and the guide sleeve (**fig.11.2**) on the compensating link plate (**fig.11.4**).



WARNING: The marks on the guide sleeve (**fig.12.2**) and the link plate (**fig.12.4**) must align.



- 3.3.9. Guide the link plate (**fig.13.4**) and the camshaft drive gear (**fig.13.1**) into the gear cavity from above. Refit the outer bearing cap and tighten hand tight.



- 3.3.10. VS5036 Eccentric Pin Holding Tool
Install the eccentric pin (**fig.14.5**), oiling all surfaces, ensuring that the marking on the eccentric pin (**fig.14.5**) is vertical and uppermost; with the marking on the link plate (**fig.14.1**) aligning with the sealing surface of the cylinder head.

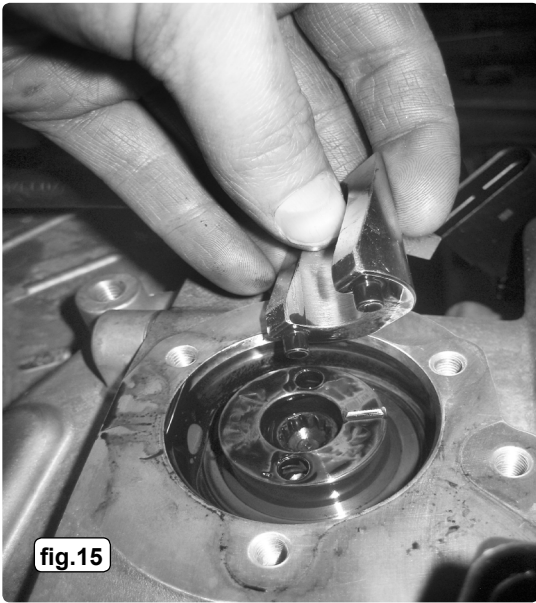


fig.15

3.3.11. VS5036 is used to turn and hold the eccentric pin in the installed position whilst securing with a new bolt (fig.15).



fig.16

3.3.12. Install a new securing bolt (fig.12.6) for the eccentric pin (fig.12.5) and tighten by hand, then unscrew back approximately one thread pitch.

3.3.13. Position VS5036 Eccentric Pin Holding Tool with a torque wrench into the holes of the eccentric, turning the eccentric pin carefully **anti-clockwise** and tighten to **50Ncm**

3.3.14. Whilst holding the eccentric pin in this position, tighten new securing bolt to **20Nm +90°**. Remove the outer bearing cap.

3.3.15. Install the outer bearing cap using sealant and tighten with new bolts to **8Nm + 90°**.

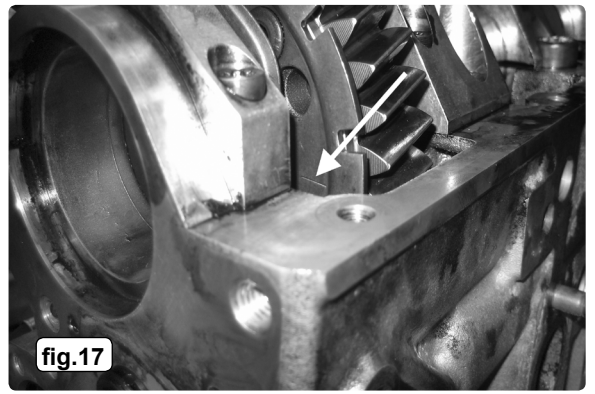


fig.17

3.3.16. Position the camshaft gear wheel onto the camshaft ensuring that the marking arrow on the sender wheel aligns with the upper edge of the cylinder head sealing surface (fig.17).

3.3.17. Using a new bolt secure the camshaft gear wheel and the tandem pump shaft, tighten bolt finger tight. At this point the camshaft gear wheel can still turn.

NOTE: Lubricate the gear wheel teeth with engine oil prior to installation.

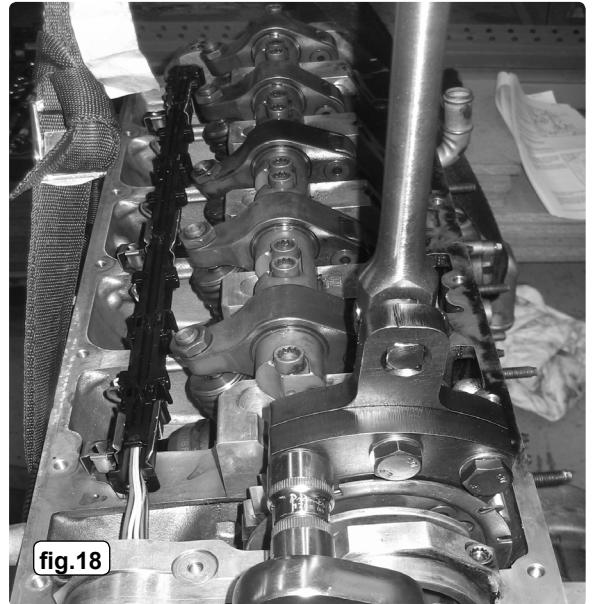
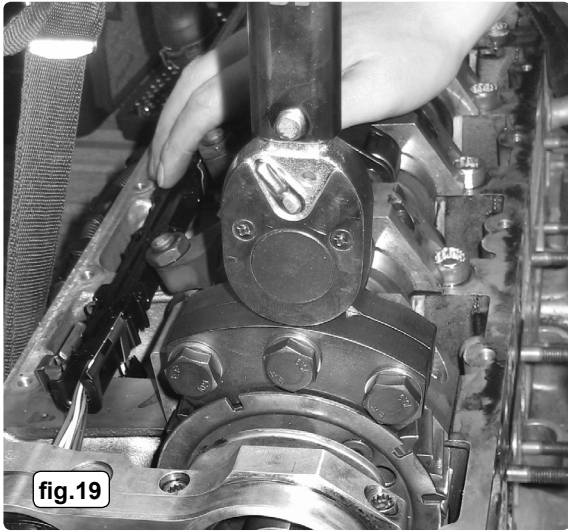


fig.18

3.3.18. VS5037 Camshaft Gear Adjuster.

VS5037 is used to eliminate play in the gear train before tightening the camshaft gear securing bolt.

Position VS5037 Camshaft Gear Adjuster onto the camshaft gear and tighten the three bolts to **70Nm** to clamp the adjuster onto the camshaft gear (fig.18).

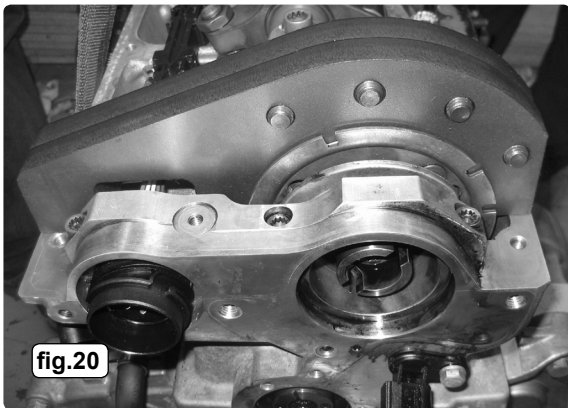


3.3.19. Using a suitable torque wrench in the square drive of the Camshaft Gear Adjuster, exert a force of **80 Nm** in the **opposite** direction of engine rotation to remove play from the gear train (fig.19).

Whilst maintaining this force, tighten the camshaft gear securing bolt to **50 Nm**.

NOTE: Tightening this camshaft gear securing bolt will require the assistance of a second mechanic.

3.3.20. Remove the Camshaft Gear Adjuster.

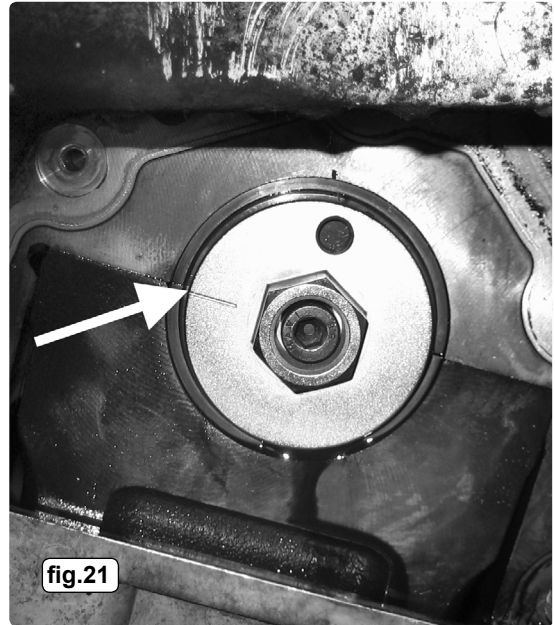


3.3.21. Position VS5034 Camshaft Gear Clamp onto the camshaft gear and tighten the four bolts to **40Nm**.

NOTE: Ensure that the clamp plate fits fully onto the surface of the cylinder head with no gap (fig.20).

3.3.22. Tighten camshaft gear securing bolt to **150 Nm + 90°**
Remove **all** tools.

3.3.23. Install the tandem pump, cylinder head cover and acoustic cover.



3.3.24. Using VS5031 Crankshaft TDC Positioning Tool (fig.21), rotate the engine in direction of engine rotation twice until the crankshaft is set again to TDC No.1 cylinder.

3.3.25. Refit VS5032 Crankshaft Locking Tool and VS5033 Camshaft Locking Tool to check the timing position - as described in **Checking valve timing**.

3.3.26. Remove **all** tools.

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 equipment.

WARRANTY: Guarantee is 12 months from purchase date, proof of which will be required for any claim.

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