



TIMING TOOL KIT - VAG 1.0/1.2/1.4TSI

BELT DRIVE

MODEL NO: **VS5145.V3**

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 & 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. KEEP THESE INSTRUCTIONS SAFE FOR FUTURE USE.



Refer to
instructions



Wear eye
protection

1. SAFETY

- WARNING!** Wear approved eye protection. Wear appropriate Personal Protective Equipment. A full range of Personal Protective Equipment is available from your Sealey stockist.
- WARNING!** Ensure that Health & Safety, Local Authority Regulations and general workshop practice Regulations are adhered to when using tools.
- DO NOT** use tools if damaged.
- Maintain tools to ensure that they are in an adequate condition for safe use and optimum performance.
- Ensure that a vehicle that has been raised by a jack is adequately supported. Use axle stands.
- DO NOT** attempt to start or move a vehicle whilst in gear and with timing devices fitted.
- Wear suitable clothing to avoid snagging. **DO NOT** wear jewellery. Tie back long hair.
- Account for all tools, parts and components being used. **DO NOT** leave these in or near the engine. Return tools to suitable storage after use.
- When not in use, store in a safe, dry childproof place.
- Keep children and unauthorised persons away from the work area.

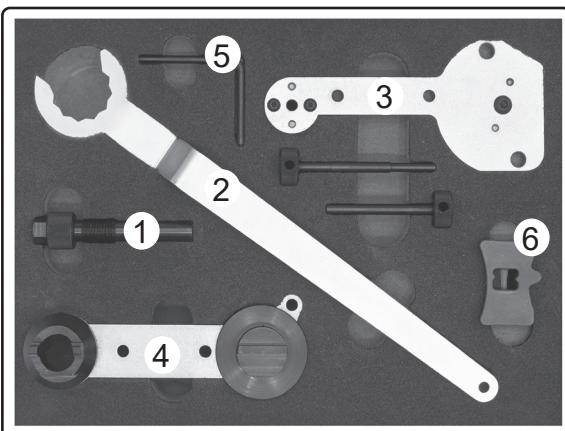
IMPORTANT! These instructions are provided as a guide only. Always refer to the vehicle manufacturer's service instructions or a proprietary manual to establish the correct procedure and data.

- WARNING!** The warnings, cautions and instructions in this manual cannot cover all possible conditions and situations. The Operator / user must apply caution and common sense (good practical sense).
- When timing an engine, always prevent the engine from being turned over. Use a notice and / or inhibit the engine.
- WARNING!** Incorrect or out of phase camshaft timing can result in contact between the valve head and the piston crown. This will cause damage to the engine.

2. INTRODUCTION

Suitable for the latest VAG 1.0, 1.2, 1.4 TSi belt drive petrol engines including the 1.4 TSi ACT. Contains essential tools for camshaft locking, crankshaft replacement and timing belt replacement. Supplied in storage case.

3. CONTENTS



Item:	Parts No:	Description	OE Tools Ref:
1	VS5145-01	Crankshaft Locking Pin	T10340
2	VS5145-02	Tensioner Adjusting Spanner	T10499
3	VS5145-03	Camshaft Setting Tool (ACT equipped)	T10494
4	VS5145-04	Camshaft Setting Tool (1.2/1.4)	T10504
5	VSE5951-10	Tensioner Locking Pin	T10060A
6	VS5145-06	Camshaft Sprocket Locking Tool	T10476/A

4. APPLICATION

Models:

Audi:

A1 (12-18), A1 Sportback (12-18), A3 (13-18), A3 Sportback (12-17), A3 Cabriolet (15-18), A4 (15-18), Q2 (16-18), Q3 (15-18).

Seat:

Alhambra (15-17), Ateca (16-18), Ibiza (12-17), Leon (12-18), Leon ST (14-18), Tarraco (19-24), Toledo (12-17).

Skoda:

Fabia III (14-22), Kodiaq (17-24), Karoq (20-21), Octavia II (10-13), Octavia III (10-18), Rapid (15-19), Rapid Spaceback (15-19), Superb III (15-18), Yeti (15-17), Yeti Outdoor (15-17).

Volkswagen:

Beetle (15-16), Caddy/Caddy Maxi (15-21), CC (15-17), Golf VII (08-18), Golf VII Estate (08-18), Golf Sportsvan (14-21), Jetta (12-18), Load Up! (16-18), Passatt (14-18), Passatt Alltrack (15-18), Polo (12-19), Scirocco (14-18), Sharan (15-18), Tiguan (16-22), Touran (15-19), T-Roc (17-20), Up! (16-21).

Engines:

1.0 TSi: CHZA, CHZB, CHZC, CHZD, CHZF, CHZG, CHZJ, CHZK, CHZL, DKLC, DKLD, DKRA.

1.2 TSi: CJZA, CJZB, CJZC, CJZD, CHPA, CMBA.

1.4 TSi: CHPA, CHPB, CPTA, CPVA, CPWA, CRJA, CUKB, CVNA, CXSA, CXSB, CZCA, CZCB, CZDA, CZE.

5. INSTRUCTIONS

5.1. ENGINE TIMING - CHECK

5.1.1. Remove the air intake pipe, turbo pipe and charcoal filter connection pipe.

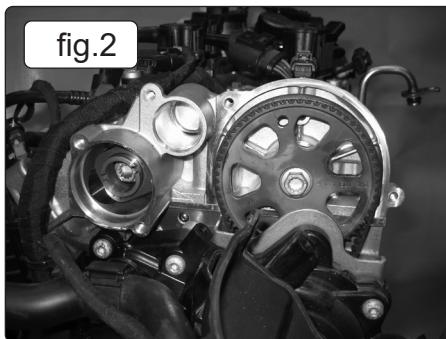
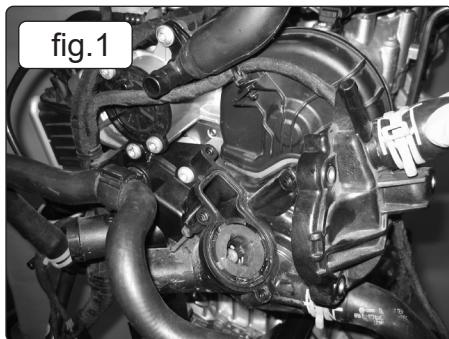
IMPORTANT: Cap the ends of all open pipes to prevent ingress of dirt and foreign objects.

5.1.2. Detach the crankcase breather hose from the rear of the camshaft cover.

5.1.3. Drain the coolant system.

5.1.4. Detach the thermostat housing from the rear of the engine (fig.1) and position it to one side to give access to the coolant pump drive belt cover.

WARNING: Ensure that engine is cold before starting work on the coolant system.



5.1.5. Detach the coolant pump drive belt cover from the engine (fig.2).

5.1.6. Position the drive belt cover and the wiring harness to one side to give access to the coolant pump drive belt sprocket.

5.1.7. Remove the end cap from the rear of the inlet camshaft.

5.1.8. Remove all ignition coils and spark plugs from the cylinder head.

5.1.9. Using a suitable indicator rod inserted through the spark plug aperture of no.1 cylinder (fig.3), rotate the crankshaft in the normal direction of engine rotation until the piston is at bottom dead centre on No.1 cylinder.

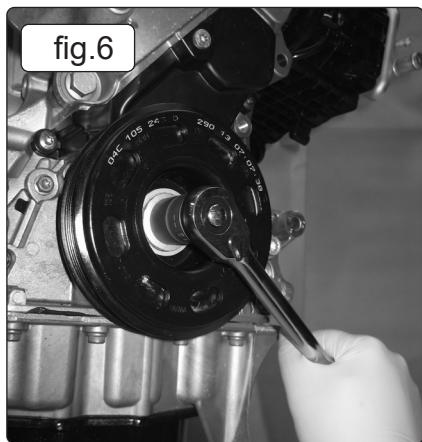
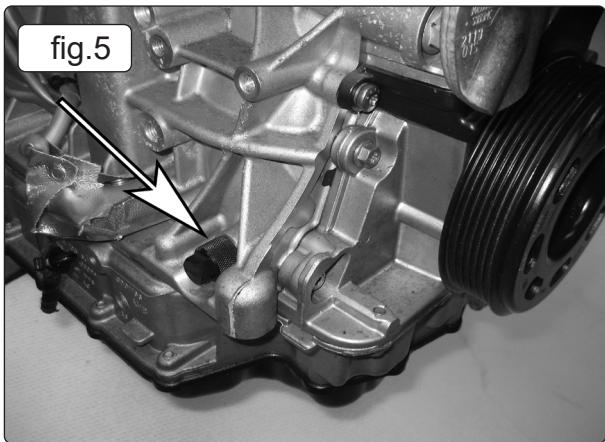
Note: It is possible to complete engine timing procedures with the ignition coil and spark plug removed from No.1 cylinder only.

Removing all spark plugs will make rotation of the crankshaft smoother and easier.

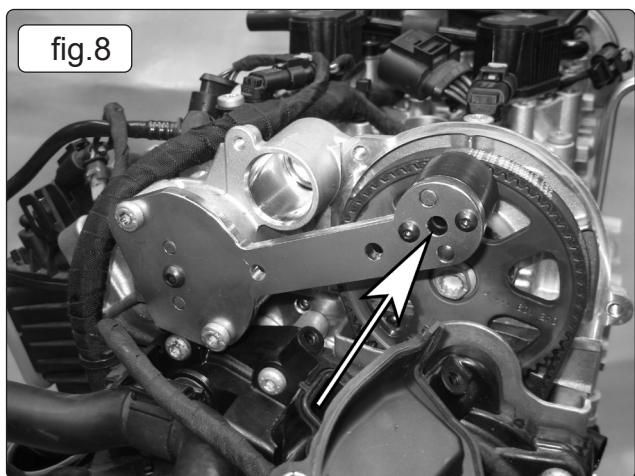
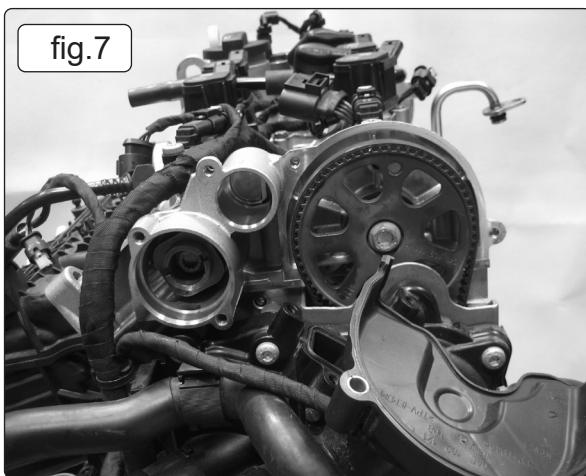


5.1.10. Continue to rotate the crankshaft in the normal direction of engine rotation until the indicator pin rises 30mm (fig.4).

- 5.1.11. Remove the crankshaft blanking plug.
- 5.1.12. Fit VS5140-01 crankshaft locking pin, ensuring that it is located fully in the engine (fig.5). If VS5140-01 crankshaft locking pin cannot be inserted fully, remove it from the engine. Rotate the crankshaft 90° in the normal direction of engine rotation. Refit crankshaft locking pin, ensuring that it is located fully in the engine.
- 5.1.13. Tighten VS5140-01 crankshaft locking pin to 30Nm.



- 5.1.14. Rotate the crankshaft in the normal direction of engine rotation until the crankshaft contacts VS5140-01 crankshaft locking pin (fig.6)
- 5.1.15. Check that the timing hole on the coolant pump drive sprocket is aligned with the hole in the cylinder head and that the timing slot in the rear of the exhaust camshaft is above the centreline of the camshaft (fig.7).
- 5.1.16. If the camshafts are not in the correct position, remove VS5140-01 crankshaft locking pin, then rotate the crankshaft 1 full turn in the normal direction of rotation. Refit the pin and continue to rotate the crankshaft until the crankshaft contacts VS5140-01 crankshaft locking pin.



- 5.1.17. Fit VS5145-03 camshaft setting plate into the timing slot at the rear of the exhaust camshaft (fig.8). Retain VS5145-03 in position using the screws removed from the camshaft end cap, tightened finger tight only at this stage. Fit timing check pin through the body of VS5145-03 setting plate and into the timing hole of the cylinder head (fig.9).
- IMPORTANT:** Do not use excessive force when fitting VS5145-03 camshaft setting tool. Small adjustments to the camshaft position may be required when fitting the tool.
- 5.1.18. Check that VS5145-03 has been fitted correctly. The check pin must be located so that the location groove is level with or deeper than the face of VS5145-03 setting plate. If the check groove is visible, the engine timing may be incorrect.
- 5.1.19. If the crankshaft locking pin and VS5145-03 camshaft setting tool cannot be fitted as described, the valve timing will require adjustment.



5.2. VEHICLES WITHOUT ACTIVE CYLINDER TECHNOLOGY (ACT)

5.2.1. Engines without ACT follow the same basic timing check procedure but utilise a different camshaft setting tool. VS5145-02 camshaft setting tool is included within VS5145 engine setting/locking kit to enable engine timing procedures to be carried out on engines without ACT.

THE HIGHLIGHTED TEXT IN THIS INSTRUCTION IS ONLY APPLICABLE TO ENGINES WITHOUT ACT.

5.2.2. Check that the timing slots in the rear of both camshafts are positioned above the centreline of the camshafts (fig.10).

5.2.3. Fit VS5140-04 camshaft setting plate into the timing slots at the rear of the camshafts and retain in position using one of the screws removed from the camshaft end cap, tightened finger tight only at this stage. (fig.11).

IMPORTANT: Do not use excessive force when fitting VS5145-02 camshaft setting tool. If it is not possible to fit VS5145-02 fully into the slots of the camshafts, the engine timing will require adjustment. Small adjustments to the camshaft position may be required when fitting the tool, this can be achieved by applying downward pressure to the timing belt between the camshaft sprockets.

5.2.4. If the crankshaft locking pin and camshaft setting tool cannot be fitted as described, the valve timing will require adjustment.

fig.10

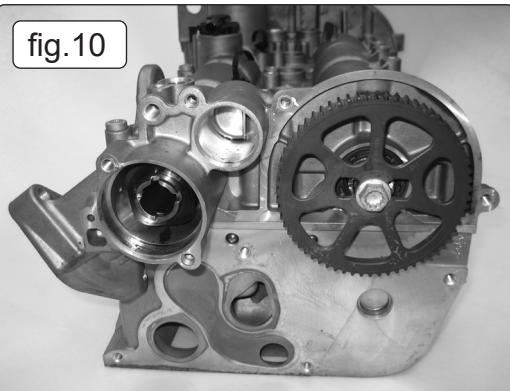
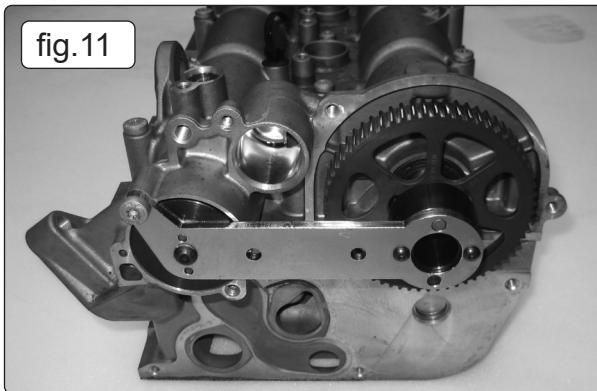


fig.11



5.3. ENGINE TIMING - ADJUSTMENT

5.3.1. This instruction assumes that the engine timing belt will be replaced as part of the engine timing adjustment procedure. If the engine timing belt, belt tensioner and idler pulley are not being replaced the auxiliary belt, alternator, engine mounting bracket and lower timing belt cover do not need to be removed.

5.3.2. Rotate the auxiliary drive belt tensioner to release tension, retain the tensioner in position using VSE5951-10 auxiliary belt tensioner locking pin.

5.3.3. Remove the auxiliary drive belt and belt tensioner from the engine.

Note: If the auxiliary drive belt is to be refitted, mark the direction of rotation on the belt before removal.

5.3.4. Loosen the lower alternator retaining bolt.

5.3.5. Remove the upper alternator retaining bolt, rotate the alternator in a clockwise direction, then tighten the lower retaining bolt to retain the alternator in position.

5.3.6. Using a suitable counterhold, release the central bolt of the crankshaft pulley (fig.12).

IMPORTANT: Engine setting/locking tools **MUST NOT** be used to counterhold the crankshaft when releasing or tightening the crankshaft pulley bolt.

fig.12

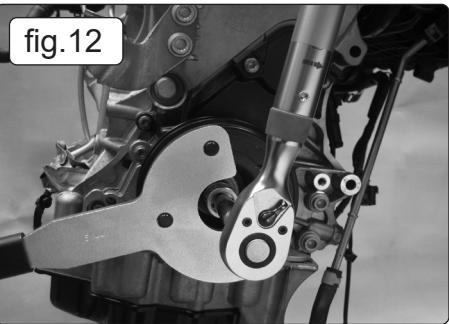
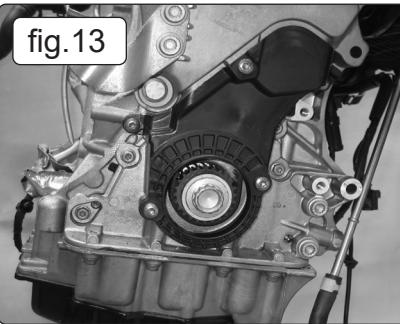


fig.13



5.3.7. Remove the crankshaft pulley and discard the used crankshaft pulley central bolt (fig.13).

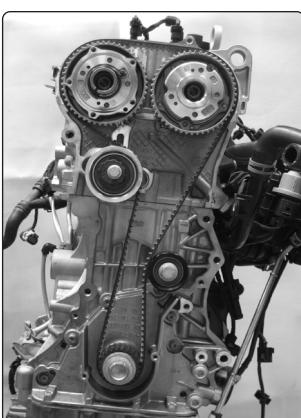
5.3.8. Fit a new crankshaft pulley central bolt loosely to retain the sprocket on the crankshaft.

WARNING: DO NOT tighten the crankshaft pulley bolt with the pulley removed. Tightening the crankshaft pulley bolt without the pulley fitted could damage the profile face of the crankshaft sprocket.

fig.14



fig.15



- 5.3.9. Remove the lower timing belt cover (fig.14).
- 5.3.10. Using a safe, suitable method support the engine.
- 5.3.11. Remove the engine mounting bracket from the engine to expose the timing belt, tensioner and idler pulley (fig.15).
- 5.3.12. Loosen the timing belt tensioner retaining bolt.
- 5.3.13. Using VS5140-04 tensioner adjustment tool, rotate the tensioner in an anti-clockwise direction to release tension from the belt (fig.16).



- 5.3.14. Remove the engine timing belt. If the timing belt is to be refitted, mark the direction of rotation on the belt before removing it from the engine.
- 5.3.15. Ensure that VS5140-01 crankshaft locking pin is fitted (fig.5) and that the crankshaft is still in the correct position. The web of the crankshaft Ensure that the crankshaft locking pin is fitted and that the crankshaft is still in the correct position.
- 5.3.16. Using a suitable counter hold tool, such as VS783 camshaft sprocket holding tool, remove the blanking plug from the VVT unit on the Inlet camshaft sprocket and the blanking plate from the VVT unit on the exhaust camshaft sprocket.
- 5.3.16a. Using a suitable counter hold tool, such as VS783 camshaft sprocket holding tool, remove the blanking plug from the VVT unit on the Inlet camshaft sprocket.

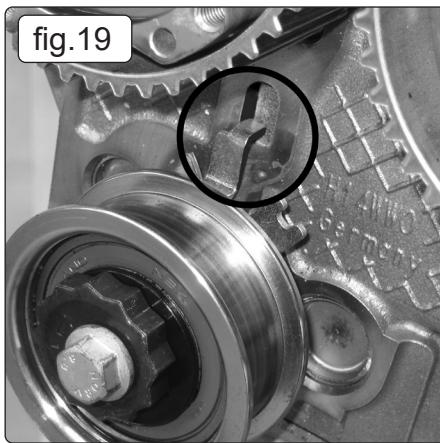
IMPORTANT: Engine oil may escape from the VVT units when the blanking caps are removed. Take care not to contaminate the toothed belt sprockets or pulleys.

- 5.3.17. Using a suitable tool, such as VS783 camshaft sprocket holding tool, rotate the inlet camshaft until the timing slot in the rear of the camshaft is horizontal and above the centerline of the camshaft (fig.18).
- 5.3.17a. Using a suitable tool, such as VS783 camshaft sprocket holding tool, rotate the inlet and exhaust camshafts until the timing slots in the rear of the camshafts are horizontal and above the centerline of the camshafts (fig.2).
- 5.3.18. Fit VS5145-03 camshaft setting tool plate into the timing slots in the rear of the inlet camshaft (fig.8). Retain VS5145.03 in position using the screws removed from the camshaft end cap, tightened finger tight only at this stage.
- 5.3.18a. Fit VS5145-02 camshaft setting tool into the timing slots in the rear of the inlet and exhaust camshafts (fig.11). Retain VS5145-02 in position using one of the screws removed from the camshaft end cap.
- 5.3.19. Using a suitable tool, such as VS783 camshaft sprocket holding tool, rotate the exhaust camshaft until the timing hole in the coolant pump is aligned with the timing hole in the cylinder head (fig.2).
- 5.3.20. Fit camshaft setting pin through the body of VS5145-03 setting plate and into the timing hole of the cylinder head. The head of the camshaft setting pin must contact the setting plate. If the setting pin is not fully located in the hole of the cylinder head, incorrect camshaft timing may result (fig.9)

Note: When fitting VS5145-03 or VS5145-04 camshaft setting tools, the assistance of a second technician is recommended in order to fit the tool to the camshafts while the camshaft timing position is maintained.

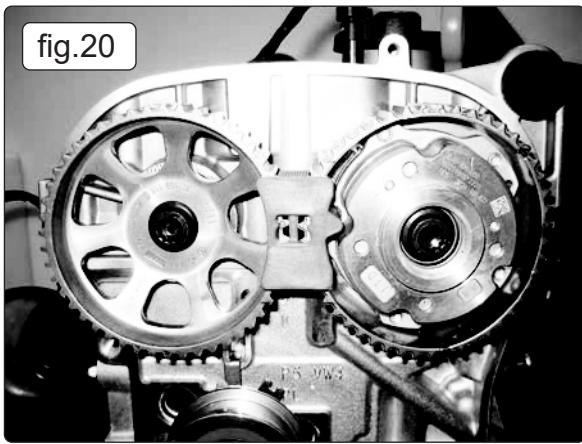
- 5.3.21. Using a suitable counterhold tool, such as VS783 camshaft sprocket holding tool, remove the central bolt of the inlet and exhaust camshaft sprockets.

Replace the central bolts of the inlet and exhaust camshaft sprockets with new bolts, hand tighten only at this stage (fig.18).



IMPORTANT: Engine setting/locking tools **MUST NOT** be used to counterhold the camshaft when releasing or tightening the camshaft sprocket bolts.

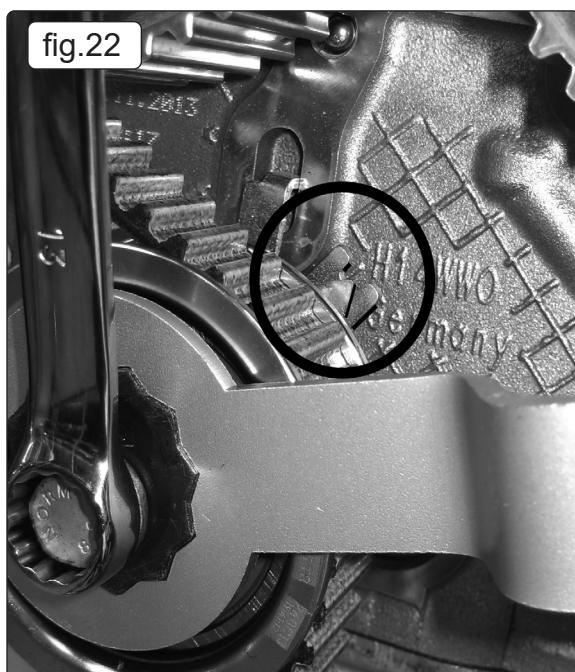
- 5.3.22. Replace the timing belt tensioner and idler pulley. Tighten the guide pulley retaining bolt to 45Nm. Ensure that the metal location tab of the tensioner is located in the aperture of the engine block (fig.19). Tighten the belt tensioner retaining bolt hand tight only at this stage.
- 5.3.23. Ensure that the crankshaft is set in the correct position, contacting VS5140-01 crankshaft locking pin and that the camshaft sprockets are free to rotate on the camshafts.
- 5.3.24. 1.0 Engine (fig.20): Fit AST5142 camshaft sprocket locking tool onto the front of the camshaft sprockets.
- 5.3.25. Ensure that the timing arrows of AST5142 camshaft sprocket locking tool are aligned with the timing marks on the camshaft sprockets.



5.3.26. Install the timing belt on the crankshaft sprocket, tensioner pulley and idler pulley ensuring that the teeth of the belt are fully located in the teeth of the crankshaft sprocket. Install the timing belt on the camshaft sprockets (fig.15)

□ **WARNING:** The timing belt is manufactured from glass fibre material. **DO NOT** force the belt over the teeth of the sprockets as this can cause damage to the teeth of the belt. **DO NOT** bend the belt to less than a 50mm diameter circle. Take care not to cause damage to the belt when fitting as this will reduce the service life of the belt.

5.3.27. Using VS5140-04 tensioner adjustment tool, rotate the eccentric central mandrel of the timing belt tensioner in a clockwise direction until the pointer is approximately 10mm past the adjustment indicator groove (fig.22).



5.3.28. Rotate the mandrel in an anti-clockwise direction until the pointer is aligned with the indicator groove (fig.22) Maintaining the position of the tensioner, tighten the tensioner locking bolt to 25Nm.

Note: Belt tension may settle during initial rotation of the engine. The tension indicator may not return to the same position. Slight differences in tension indicator position are normal and do not affect the operation of the tensioner or the timing belt.



5.3.29. Using a suitable counter hold tool, such as VS783 camshaft sprocket holding tool, tighten the central bolts of the camshaft sprockets to 50Nm (figs.23 & 24).
IMPORTANT: Engine setting/locking tools **MUST NOT** be used to counterhold the camshaft when releasing or tightening the camshaft sprocket bolts.

5.3.30. Refit the crankshaft pulley, tightening the crankshaft central bolt hand tight only at this stage, in order to retain the crankshaft pulley while rotating the crankshaft.

5.3.31. Remove all engine setting/locking tools.

5.3.32. Rotate the engine two full turns in the normal direction of engine rotation. Refit VS140-01 crankshaft locking pin (fig.5) and rotate the crankshaft in the normal direction of engine rotation until the crankshaft web contacts the locking pin

5.3.33. Fit VS5145-03 camshaft setting plate into the timing slot at the rear of the exhaust camshaft. Retain VS5145-03 in position using the screws removed from the camshaft end cap, tightened finger tight only at this stage. Fit timing check pin through the body of the setting plate and into the timing hole of the cylinder head.
IMPORTANT: Do not use excessive force when fitting the camshaft setting tool. Small adjustments to the camshaft position may be required when fitting the tool.

5.3.34. Check that VS5145-01 has been fitted correctly (fig.9)
The check pin must be located so that the location groove is level with or deeper than the face of the setting plate. If the check groove is visible, the engine timing may be incorrect. If the crankshaft locking pin and camshaft setting tool cannot be fitted as described, the valve timing will require adjustment.

5.3.32. Fit VS5145-02 camshaft setting plate (fig.11) into the timing slots at the rear of the camshafts and retain in position using one of the screws removed from the camshaft end cap, tightened finger tight only at this stage.
IMPORTANT: Do not use excessive force when fitting the camshaft setting tool. If it is not possible to fit VS5145-02 fully into the slots of the camshafts, the engine timing will require adjustment. Small adjustments to the camshaft position may be required when fitting the tool, this can be achieved by applying downward pressure to the timing belt between the camshaft sprockets.
If the crankshaft locking pin and camshaft setting tool cannot be fitted as described, the valve timing will require adjustment.

5.3.33a. Using a suitable counter hold tool, such as VS783 (figs.23 & 24) camshaft sprocket holding tool, tighten the central bolts of the camshaft sprockets to 50Nm+135°.

5.3.33b. Using a suitable counter hold tool, such as VS783 (figs.23 & 24) camshaft sprocket holding tool, tighten the central bolts of the inlet cam shaft sprocket / VVT unit to 50Nm+135°.
Tighten the central bolt of the exhaust camshaft sprocket to 50Nm+90°.



fig.25

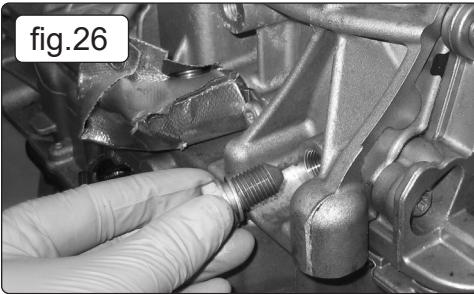


fig.26

5.4. REASSEMBLY

5.4.1. Refit the blanking plug from the VVT unit of the Inlet camshaft sprocket (fig.25). Using a suitable counter hold tool, such as VS783 camshaft sprocket holding tool, tighten blanking plug to 20Nm.

5.4.2. Refit the blanking plate from the VVT unit of the exhaust camshaft sprocket. Using a suitable counter hold tool, such as VS783 camshaft sprocket holding tool, tighten the blanking plate retaining bolts to 8Nm+45°.

5.4.3. Remove VS140-01 crankshaft timing pin and refit crankshaft blanking plug, tighten to 30Nm (fig.26).

5.4.4. Remove the crankshaft pulley.



fig.27

5.4.5. Refit the aluminium engine mount bracket.
Starting at the lower retaining bolt and working in a clockwise direction, initially tighten the three bolts to 7Nm. Repeat the sequence, tightening each bolt to a torque of 40Nm.
Repeat the sequence, finally tightening each bolt by a further 90° (fig.27).

5.4.6. Refit the plastic lower timing belt cover, tightening the retaining bolts to 8Nm (fig.13).

5.4.7. Refit the crankshaft pulley and pulley central bolt (fig.12).
Ensure that the profiled face of the crankshaft pulley is located correctly against the profiled face of the crankshaft sprocket.
Using a suitable counter-hold crankshaft pulley holding tool, tighten the central bolt of the crankshaft pulley to 150Nm+180°.

5.4.8. **IMPORTANT:** Engine setting/locking tools **MUST NOT** be used to counterhold the crankshaft when releasing or tightening the crankshaft pulley bolt.

5.4.9. Refit the alternator, tightening all retaining bolts to the manufacturer's torque settings.
Refit the auxiliary belt, ensuring that the auxiliary belt is correctly located on the tensioner pulley and in the grooves of the crankshaft, alternator and air conditioning compressor pulleys.

5.4.10. Refit the camshaft end cap and coolant drive belt cover to the rear of the engine and the timing belt cover to the front of the engine.

5.4.11. Refit the thermostat cover, coolant pipes, breather pipes and air intake pipes.

5.4.12. Refill the coolant system to the manufacturer's specification.

5.4.13. Further assembly is carried out in the reverse order of removal.



ENVIRONMENT PROTECTION

Recycle unwanted materials instead of disposing of them as waste. All tools, accessories and packaging should be sorted, taken to a recycling centre and disposed of in a manner which is compatible with the environment. When the product becomes completely unserviceable and requires disposal, drain any fluids (if applicable) into approved containers and dispose of the product and fluids according to local regulations.



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Important: No Liability is accepted for incorrect use of this product.

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

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