Technical Bulletin

042
31/01/2011

VAG 2.5 V6 TDI – Timing Belt set-up.

GATES REFERENCE :	5520XS, K035520XS, K045520XS, 5531XS and kits, 5557XS, K015557XS, K025557XS, T41095, T43029, T43036.
MAKE :	AUDI / SKODA / VOLKSWAGEN
MODEL :	A4, A6, A8, Superb, Passat
ENGINE :	2.5 V6 TDI
ENGINE CODE :	AFB, AKE, AKN, AYM, BAU, BCZ, BDG, BDH, BFC.

Through our field visits we have learned of several possible issues with these engines. In a lot of cases these issues will lead to engine failure.

Possible problems:

1) Camshaft wear on the early models (up to 2003): there are potential issues with insufficient lubrication of the camshafts. This will lead to power loss, insufficient combustion (exhaust smokes), possible shearing off of the (normal) rocker arms (Fig. 1); resulting in camshaft wear (Fig. 2), blockage and belt rupture. Later models equipped with "roller" rocking arms do not have this issue anymore.
2) Although the Timing Belt is tensioned by means of a hydraulic tensioner element, many errors are made during the tensioner setting, leading to premature belt failure.
3) In some cases a rough running vacuum pump (hard points) will put extra wear on the belt, possibly leading to premature failure.

Fig. 1

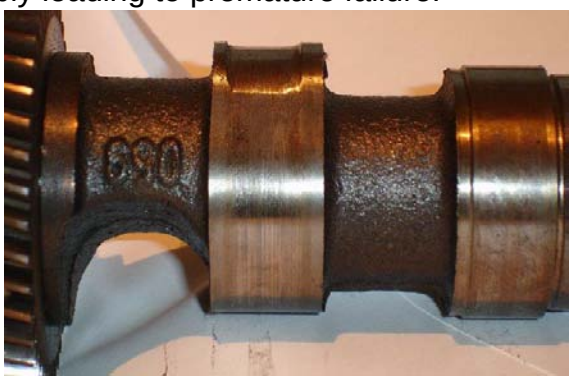

Fig. 2

Recommendations

It is vital that the correct installation tools (to be found in GAT4450) are used in order to fit the belts correctly. To prevent premature belt failure, always follow the manufacturers' recommended fitting procedure.

1) Turn the engine clockwise until the 'OT' marking on the camshaft is centered through the oil filling hole (oil filler cap removed) (Fig 3).

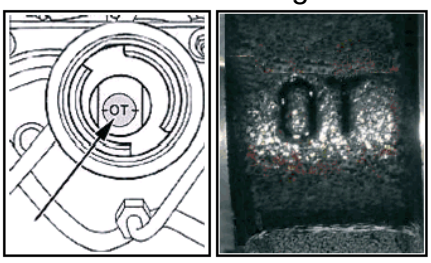

Fig. 3

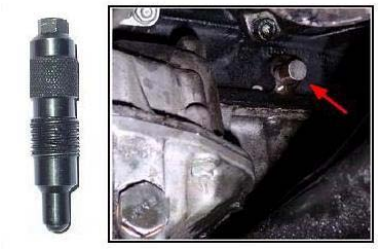

Fig. 4

More Technical Advice

Copyright © 2011 Gates Corporation

2) Remove the TDC cap from the engine block and put in the crankshaft locking pin (GAT4401); which is used to retain the crankshaft at TDC position. The locking pin has to be screwed in via a threaded hole in the crankcase (Fig.4).
3) By removing both camshaft cover (cap) and the vacuum pump at the back of the cylinder heads, you will be able to put the camshaft setting plates (GAT4451) in the slots in the rear of each camshaft (Fig. 5). They are supplied with chains which are attached to a suitable engine part to prevent them from falling.
   NOTE: Setting plates **cannot** be used to hold camshafts in place when releasing sprocket bolts. They are only for holding timing position!

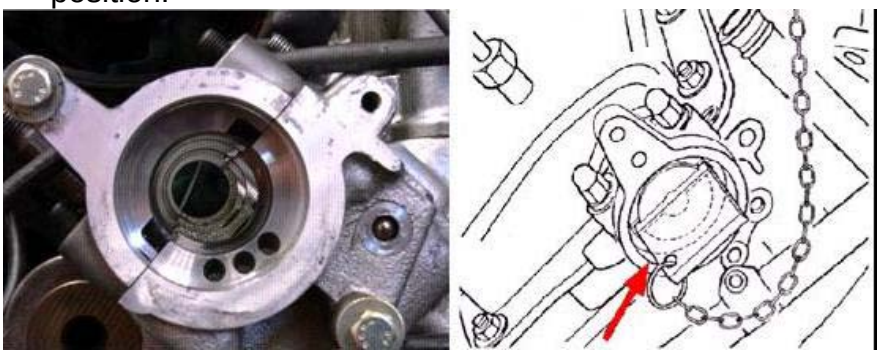

Fig. 5

4) Remove the 4 bolts from the injection pump (IP) vibration damper, and the damper. **Do not undo the central bolt!!!**
5) Insert the IP locking pin (GAT4440V2), slacken tensioner nut, remove IP belt, remove ventilator support and tensioner, remove outer camshaft sprocket.
6) Rotate tensioner clockwise till 2 mm pin (GAT 4360T1) can be fully inserted in hydraulic element (Fig. 12).
7) While holding camshaft sprockets, slacken bolts and make sprockets loose on cones (GAT4848), remove LH sprocket.
8) Check engine still at TDC position.
9) Hand tighten bolt of RH camshaft sprocket.
10) Remove belt, tensioner (pulley, lever, hydraulic element) and idler.
11) Install new idler. **ATTENTION!!!** The idler now has a countersunk hole (Fig 6), needing a shorter bolt (supplied in the kit). Failure to use the correct bolt will lead to incorrect clamping, with a sheared bolt as a result (Fig. 7)

Fig. 6

Fig.7

More Technical Advice

Copyright © 2011 Gates Corporation

12) Install rest of tensioner system. **ATTENTION!!!**
Particular attention needs to be taken in relation to the position of the lever and pin located behind the tensioner roller:
Fig 8 shows the only possible **correct** lever/pin contact.

Fig. 8 Correct

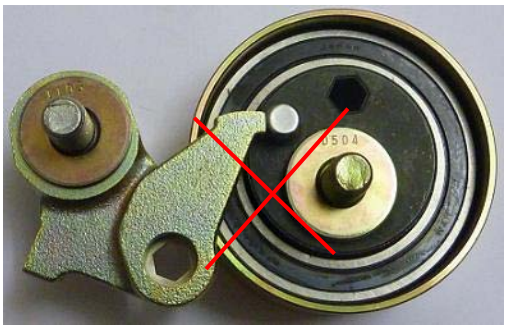

Fig. 9 Incorrect

Do not forget (1) washer behind lever and tensioner pulley!!
Any incorrect contact of the lever arm with the pin on the tensioner, or lack of washer, will cause serious damage to the system; with belt failure as a result (Fig.10).

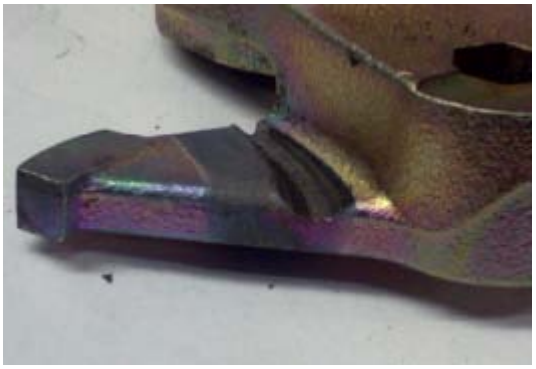

Fig 10

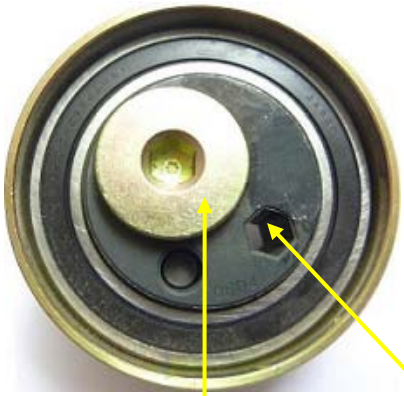

Fig 11 Fixing bolt, 8 mm Allen key

13) Install new belt in following order: crankshaft, right hand camshaft, tensioner, idler, water pump.
14) Put left hand camshaft sprocket into belt, install sprocket and belt on camshaft.
15) Install camshaft bolts finger tight
16) Turn the tensioner pulley slightly clockwise using an Allen key in the hexagonal slot (Fig 11). The lever comes to a stop on the tension piston rod (Fig. 12). Remove the hydraulic tensioner retaining pin.

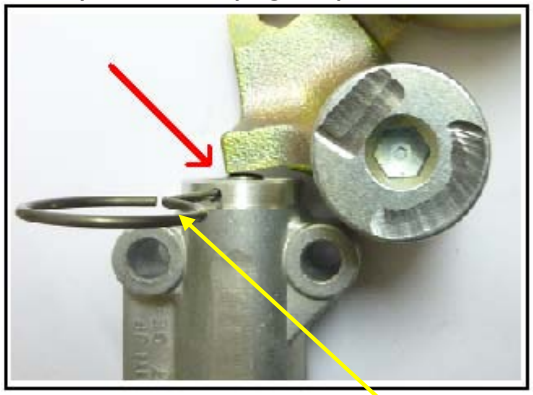

Fig 12 Retaining pin

More Technical Advice

Copyright © 2011 Gates Corporation

17) Turn the tensioner pulley anti-clockwise, against the force of the damper, using a dynamometric wrench into the Allen key hole and applying a load of **15Nm** (CRITICAL) Because of the oil pressure in the hydraulic element, this will make the tensioner pulley move out of the lever (avoiding later contact (Fig. 10)) and tension the belt.
18) While you keep the pivot deflection lever in this correct position, torque the tensioner pulley fixing bolt (Fig 11) to **42 Nm**
Now check the position of the hydraulic piston: Fig 13 shows the **correct** hydraulic piston position, Fig. 14 the incorrect position.
19) Torque the camshaft sprocket bolts to 75 Nm, while holding them in place with GAT4394.

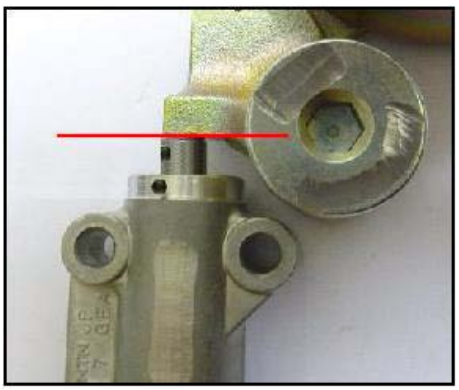

Fig 13

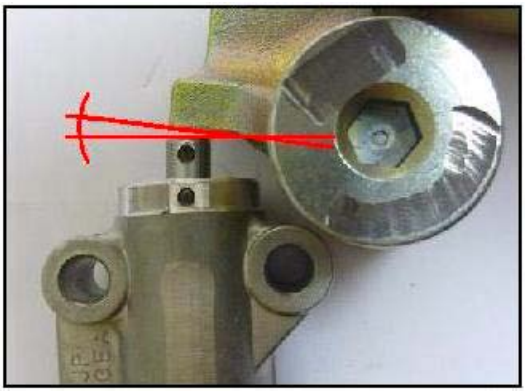

Fig 14

20) Verify engine is still at TDC, install new IP tensioner (nut hand tight) and ventilator support.
21) Install outer camshaft sprocket, bolts hand tight in centre of slotted holes. Install new belt.
22) **Use GAT4452 (Fig. 15) over tensioner nut**, turn tensioner with Allen key **anti-clockwise** till pointer aligns, tighten nut to 37 Nm with GAT4452 while holding tensioner in correct position with Allen key!!! (Fig. 16). Remark: it is possible to tension the belt by turning the tensioner clockwise, BUT this will lead to engine damage.
23) Tighten the 3 bolts to 22 Nm while holding camshaft in place with GAT4394.
24) Remove locking tools, turn engine 2 revolutions to TDC, insert locking tools, check pointer position (correct if needed); remove locking tools, fit IP vibration damper, torque bolts to 22 Nm, fit new camshaft cap.

Fig 15

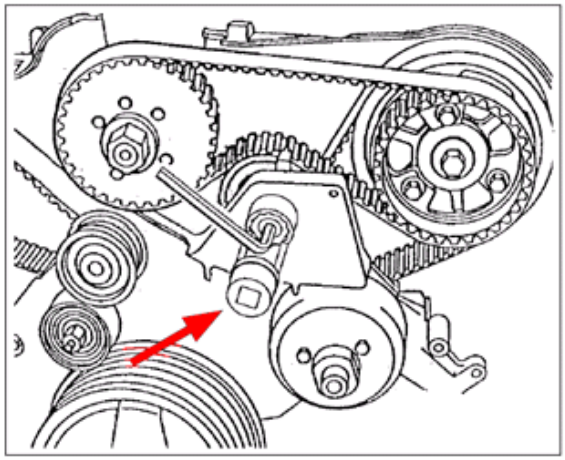

Fig. 16

Visit our web catalogue : www.gatesautocat.com

More Technical Advice

Copyright © 2011 Gates Corporation