

Tensioner problems

A VW Golf 16 Valve engine met a premature end when one of the timing belts broke. Gates Technical Support's Andrew Vaux takes us step-by-step, as he examines all of the evidence to determine why the belt failed.



When Gates technical support received a call about a problem with the drive system on a VW Golf (97-06 1.4 16V), it was a familiar story. The Golf range features a variety of engines with different drive system layouts, but one of the most intriguing is associated with 1.4L 16V engines.

Some of these twin cam engines feature two separate drive belts in two different sizes. One main camshaft belt provides the timing. A smaller cam belt drives the second cam.

Apparently, the main drive had failed prematurely and the engine was beyond repair. Technical assistance was required.

Evidence

Evidence from the broken belt is often the key to the correct diagnosis. Whenever a camshaft stops turning - as this one had - the usual suspect is the timing belt. Closer inspection showed that it was not a problem with the main drive. The smaller secondary belt had failed. Careful examination of the pieces showed that the belt had been significantly reduced in width.

It had been 'worn away' on the edge closest to the engine block, with the result that the narrower belt had been unable to sustain the load. The belt had snapped, allowing piston-valve contact that destroyed the engine.



Debris from the worn belt was abundant inside the drive system cover

A likely cause of reduced width is regular contact with the engine block. This would be clear from a scoured or polished surface on either the drive system cover or the engine block. While no evidence of any such contact could be found, debris from the worn away belt was found inside the drive system cover.

The mystery grew when careful examination of the backplate on the automatic tensioner revealed the kind of damage that had been sought. This would not normally be within the operating plane of the belt.

It was now clear that the reduction in width had been caused by contact with the belt tensioner and not the engine. This failure was a symptom of a very different problem.

Diagnostic procedure

Through careful reassembly and regular inspection of the engine components in situ, the pieces of the puzzle quickly came together. With the automatic tensioner in the correct position, contact with the small secondary belt was impossible. However, it is possible to install this automatic tensioner upside down.

When the Gates inspector placed the automatic tensioner in this position, contact with the belt was shown to be inevitable. The evidence supported the view that the automatic tensioner had been fitted incorrectly.

Sequence of events

As part of good engineering practice, the VW Golf had had a drive system overhaul, which involves replacement of belts and tensioners. In replacing the automatic tensioner however, a mechanic had installed it upside down, initiating the following sequence of events:

- small drive belt makes contact with backplate of tensioner
- contact begins to 'pare away' the edge of the belt
- width of the belt gradually reduced
- stress increases until the belt snaps
- piston to valve contact
- destruction of the engine



The upside down tensioner left no clearance room for the timing belt, as can be seen by the scoring in this picture

Conclusion

Installing a tensioner upside down is a basic error that any mechanic can make, regardless of the number of times the procedure may have been carried out on a particular model. It's always worth making a note of the position and aspect of a tensioner before it is removed.

While independent technical information sources are often very specific about the way the belt must be installed, information about the installation of tensioners is limited. For those drives where installation of the belt drive may be more complex, Gates belt kits include all the information necessary to install belts and tensioners correctly.

Gates also runs a series of free technical seminars for mechanics in association with local motor factors to make them aware of possible installation problems.

