NUMBER 028 12/06/2009

Technical Bulletin

Mitsubishi & Volvo 1.8 16V / Synchronous Drive / Tensioner Info.

GATES REFERENCE:	**5514XS & related kits.**	
MAKE:	MITSUBISHI / VOLVO.	
MODEL:	Carisma, IO, Montero, Pajero, Shogun, Space Star, S40, V40.	
MOTOR:	1.8, 1.8 GDI.	
MOTOR CODE:	4G93DOHC, B4184SJ, B4184SM.	

Explanation:

This drive is very sensitive on tensioner set up. Although the drive is equipped with an ‘automatic’ tensioner, this still has to be set up correctly. Strictly following the correct and complete installation procedure can avoid costly engine damage.

Fig. 1 shows the drive lay out of this engine, with correct position of the timing marks.

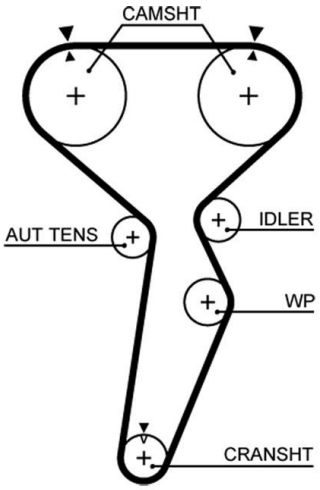

Fig. 1

There are 2 points that need special attention when installing this belt/tensioner:

1) Following the recommended tension setting procedure.

2) Turning the tensioner in correct direction = anti-clockwise. If not this leads to incorrect tension and very often tensioner seizure. The tensioner bracket touches the pulley, obstructing it to rotate freely (Fig. 2).

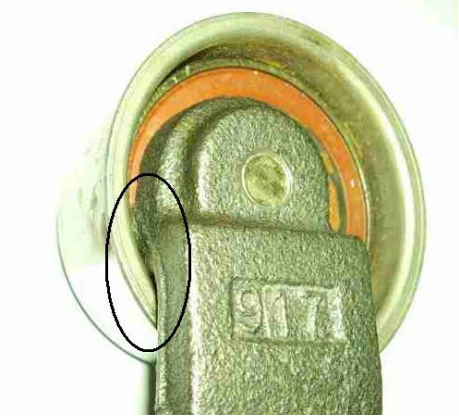

Fig. 2

Evidence of this can be found on the back inner side of the tensioner pulley (Fig. 3).

Fig. 3

Since the pulley cannot rotate anymore, the belt back - constantly rubbing against the pulley surface - will start to overheat and crack (Fig. 4).

Fig. 4

This excessive temperature is further transmitted to the tensioner and idler pulleys, leaving a blue heat mark on the pulleys (Fig. 5), and possibly even traces of melted rubber (Fig. 6).

Fig. 5

Fig. 6

If the tensioner pulley is turned in the correct – anti clockwise - direction, it will not be able to come into contact with the bracket (Fig. 7).

Fig.7

In general it is strongly recommended to replace the tensioner and idler pulleys together with the belt, as these parts obviously also wear out.
A worn bearing (loss of grease, seizure, misalignment …) is just as bad as a worn belt, and will lead to premature drive failure, resulting in serious engine damage.

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Correct procedure:

Removal

The engine must be at ambient temperature!
Remove the accessory belt, tensioner/idler pulleys, engine support and timing belt covers.
Put the engine at Top Dead Centre (TDC), with Timing Marks (TM) aligned (see Fig. 1) by rotating the crankshaft clockwise.
Lock the 2 camshaft pulleys using GAT4695 and see Fig. 8 for correct positioning.

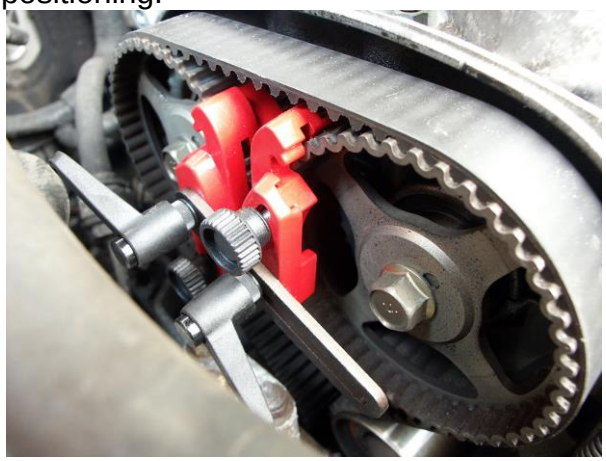


Fig. 8

Loosen the tensioner pulley bolt then remove the old belt, tensioner pulley and idler.
By now, the piston rod of the hydraulic tensioner has come out of the tensioner body by 10.5 to 11.5 mm. If not, or leakage is present, replace the tensioner.
Apply a pressure of 10 to 20 Kg on this rod; movement of the rod should be maximum 1 mm. If more, replace the tensioner.

Push the rod slowly down (vertically) until the holes of the rod and the tensioner body are in line. Insert a 2 mm retaining pin (can be found in GAT4657) (Fig. 9).

Fig. 9

Installation:

The engine needs to be at TDC (Top Dead Center)!
(Re)install the (new) hydraulic tensioner (2 bolts at 13 Nm).
Install the new tensioner and idler pulleys (tensioner pulley with eccentric hole at the top, 2 small adjusting holes at the bottom) (Fig. 10).
Rotate the crankshaft pulley ½ tooth anti clockwise.
Install new belt in this order: crankshaft, water pump, idler, outlet camshaft, inlet camshaft, tensioner.
Turn the tensioner pulley (using adjuster GAT4577 included in GAT4657) ANTICLOCKWISE into the belt and tighten the bolt (Fig. 11).

Fig. 10

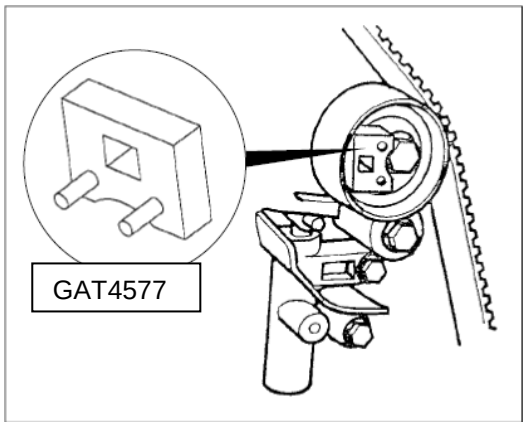


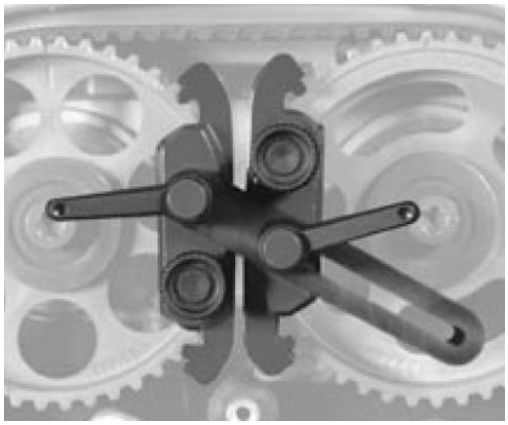
Fig. 11

Unlock the camshaft pulleys and check if all Timing Marks are aligned.
Turn the crank pulley +/- 90° ANTICLOCKWISE.
Turn the crank pulley +/- 90° CLOCKWISE till TDC (all Timing Marks aligned).
Loosen the tensioner pulley bolt.
Turn the tensioner pulley (using GAT 4577 and a torque wrench) ANTICLOCKWISE towards the belt, with a force of 2.5 to 4.0 Nm.
Tighten the tensioner pulley bolt (50 Nm).
Pay attention: keep the pulley in place while torqueing the bolt!
Remove the 2 mm retaining pin out of the hydraulic tensioner.
Rotate engine clockwise 720° to TDC (Timing Marks in line).
Leave engine 5 minutes like this.
The piston rod is now out of the tensioner body by 3.8 to 4.5 mm.
If not, repeat the tensioning procedure until correct position is reached.
Re-install other removed parts.

Conclusion:

- only work on cold engines
- replace timing belt, tensioner and idler pulleys at the same time
- only rotate tensioner pulley anticlockwise
- pay extreme attention to correct hydraulic tensioner set up
- follow every step in the OE installation procedure
- use the specified tools

Timing Tool Kit GAT4657



GAT4500 (included in GAT4695)

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