

AST5038

Diesel Engine

Setting/Locking Tool Set



Associated Tools:

AST4398G Injection Pump Timing Tool Kit – Bosch Rotary Pumps (2.5TDi)



AST4844 Camshaft Sprocket Holding Tool

AST4848 Camshaft Sprocket Remover (CR systems)



Applications:

V W GROUP 2.4D, 2.5SDi/TDi Diesel engines (Belt) in

VOLKSWAGEN

Transporter

LT

Crafter

Engines:

2.4D: AAB, AJA

2.5SDi/TDi: ACV, AGX, AHD, AHY, AJT, ANJ, APA, AUF, AVR, AXG, AXL, AYC, BBE, BBF, BBR

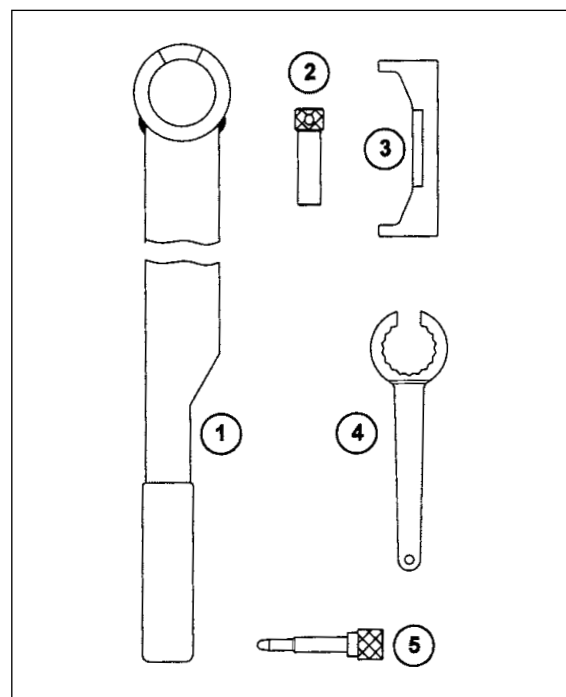
2.5TDi Common Rail: BJJ, BJK, BJJ and BJM engines

Additional AST Tools required:

AST4398G Bosch Injection Pump Timing Tool Kit

AST4844 Camshaft Sprocket Holding Tool

AST4848 Camshaft Sprocket Remover (CR systems)



Set contents/spares

Item	Part Number	Description
1	AST4438	Crankshaft Pulley Holding Tool
2	AST3054V3	Injection Pump Locking Pin
3	AST4115A-1	Camshaft Setting Plate
4	AST4435	Tensioner Adjuster
5	AST4919	Crankshaft Locking Pin

IMPORTANT: Always refer to the vehicle manufacturer's service instructions, or proprietary manual, to establish the current procedures and data. Product Information Sets detail applications and use of the tools with any general instructions provided as a guide only.

Application Chart

AST5038 Diesel Engine Setting/Locking Tool Set
Comprises: AST4438 Crankshaft Pulley Holding Tool
 AST3054V3 Injection Pump Locking Pin
 AST4115A-1 Camshaft Setting Plate
 AST4919 Crankshaft Locking Pin (CR)
 AST4435 Tensioner Adjuster

Associated Tools:
AST4398G Bosch Injection Pump Timing Tool Kit
AST4844 Camshaft Sprocket Holding Tool
AST4848 Camshaft Sprocket Remover (CR)

VAG 2.4 / 2.5 Diesel engines (Vans)	AST4438	AST3054V3	AST4115A-1	AST4919	AST4435	Associated AST Tools required
Transporter 2.4D (95-03) AAB/AJA	●	●	●		●	AST4844
Transporter 2.5TDi* (95-03) ACV/AHY/AJT/AUF/AXG/AXL/AYC/AYY	●		●		●	AST4844 AST4398G*
LT 2.4D (92-96) ACL/ACT		●	●			AST4844
LT 2.5SDi/TDi* (96-06) AGX/AHD/ANJ/APA/BBE/BBF/BBR	●		●			AST4844 AST4398G*
*NOTE: Transporter & LT 2.5SDi/TDi engines (non-common rail) require injection pump timing as part of the timing belt replacement procedure – Use AST4398G Injection Pump Timing Tool Kit – BOSCH Pumps						
LT, Crafter (06-09) 2.5TDi Common Rail diesels BBJ/BJK/BJL/BJM	●		●	●	●	AST4844 AST4848

AST5038

Engine Setting/Locking Tool Set for large capacity engines in V W Group vans

This Timing Set for the 2.4D and 2.5SDi/TDi diesels covers engines with 'Distributor Type' fuel injection pump and Common Rail systems, and contains the tools required to 'lock' the engines in their timed position for service applications such as timing belt replacement.

The AST5038 Set contains, Crankshaft Pulley Holding Tool, Tensioner Adjuster, Crankshaft Locking Pin (Common Rail variants), and Camshaft / Injection Pump Locking Tools as appropriate to each type/group of engines.

All the tools contained in the Set are also available as individual tools.

Additional AST Tools required

Camshaft and injection pump locking tools **MUST NOT** be used to counter-hold camshaft or pump sprockets whilst releasing the sprocket bolt – **use AST4844 Sprocket Holding Tool.**

2.5SDi / TDi (non-common rail) engines require the fuel injection pump to be timed as part of the timing belt replacement procedure – **use AST4398G Kit**

The camshaft sprocket on these **2.5 common rail diesels** requires the use of **AST4848 Sprocket Remover** to release the sprocket off its taper in order for it to be "free to turn" during the belt tensioning procedure

Details of these additional tools are provided in this Information.

2.4D & 2.5SDi/TDi Diesel Engines with 'Distributor Type' fuel injection pumps

AST4438 Crank Pulley Holding Tool

All these engines, within the V W group of vans, require the crankshaft pulley/damper to be removed as part of the procedure for timing belt removal/renewal, and other service applications.

The centre bolt of the crankshaft pulley has a high torque loading and it is essential to 'lock' the pulley securely and safely in position whilst releasing and tightening the pulley bolt.

For this reason, AST4438 Crankshaft Pulley Holding Tool is included in AST5038 Set.

Crankshaft Pulley Centre Bolt torque loadings:-

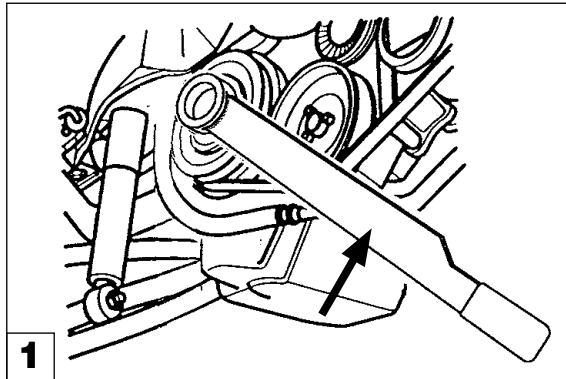
VW

Transporter 2.4D – AAB(-95) – 460Nm.
AAB(95-)/AJA - 160Nm. + 180°

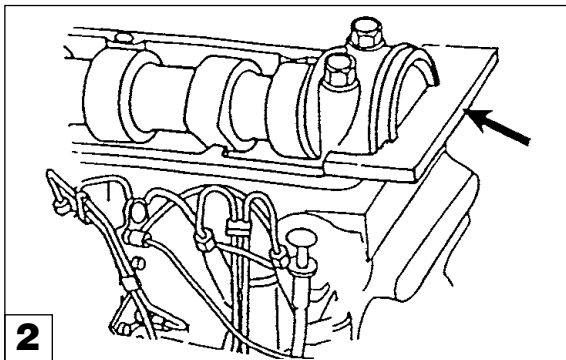
Transporter 2.5TDi – ACV/AHY/AJT/AUF/AXG/AXL/AYC -
160Nm. + 180°

LT 2.4D ACL/ACT – 460Nm.

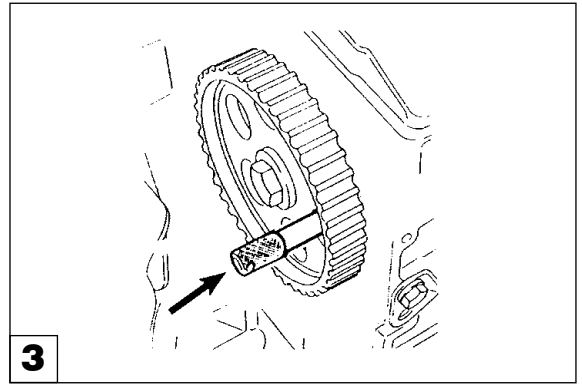
LT 2.5SDi/TDi AGX/AHD/ANJ/APA/BBE/BBF - 160Nm. + 180°



AST4438 Crankshaft Pulley Holding Tool



AST4115A-1 Camshaft Setting Plate



AST3054V3 Pump Locking Pin

AST4115A-1 Camshaft Setting Plate and AST3054V3 Injection Pump Locking Pin

AST4115A-1 Setting Plate is used to accurately align the datum slot, situated in the rear of the camshaft, with the top face of the cylinder head, in order to position the camshaft in the correct timed position.

When fitting AST4115A-1 Plate, feeler gauges of equal thickness must be inserted on both sides of the Plate, between the Plate and the surface of the cylinder head, until all free play has been eliminated.

Insert AST4115A-1 Setting Plate into the datum slot. Turn the camshaft so that one side of the Plate touches the surface of the cylinder head.

Using a feeler gauge, measure the gap, which has been created on the opposite side of the head, between Plate and cylinder head.

Insert a feeler gauge equal to half of this gap size, between the Plate and the cylinder head on one side of the head.

Turn the camshaft until the Plate contacts the inserted feeler gauge. Insert a second feeler gauge, of the same size, between the Plate and the cylinder head, on the opposite side of the head, to level the Plate and eliminate any free play.

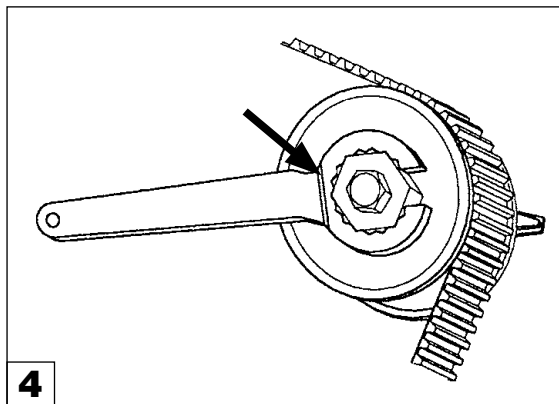
AST3054V3 Injection Pump Locking Pin is designed to pass through a datum hole in the injection pump sprocket into a fixed timing hole in the engine.

NOTE: Engines with 'Distributor Type' fuel injection pump
2.4D engines - require both the camshaft and injection pump to be 'locked' in a timed position during timing belt replacement.

2.5SDi/TDi engines - only the AST4115A-1 Camshaft Setting Plate is used as these engines do not require the injection pump to be 'locked' - **the pump timing must be re-set after timing belt replacement** - see AST4398G Injection Pump Timing Tool Kit.

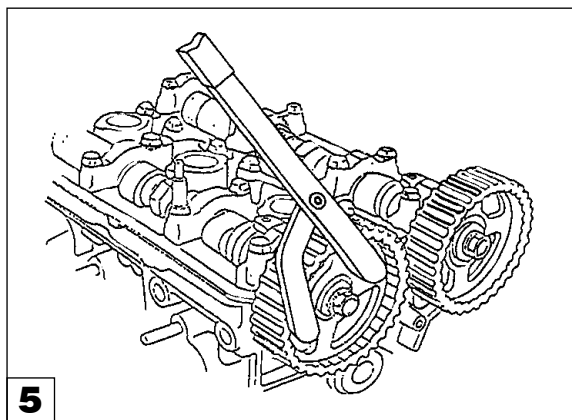
AST4435 Tensioner Adjuster

AST4435 is a specialised wrench required to adjust the tensioner position to achieve correct belt tension.



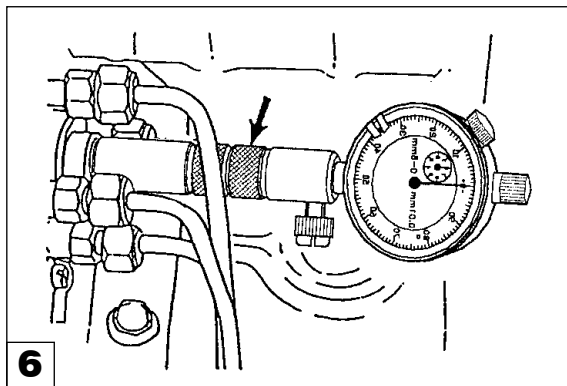
AST4435 Tensioner Adjuster

Additional AST Tools required – not included in Set



AST4844 Sprocket Holding Tool

IMPORTANT: Do NOT use Camshaft Setting Plates or Locking Pins to hold the camshaft/injection pump in position whilst releasing or re-tightening the sprocket bolt. Plates and Pins are for retention of timing position only. Use Sprocket Holding Tool AST4844 to counter-hold sprockets.



AST4398G Pump Timing Tool – Bosch VE Rotary Pumps

AST4398G Bosch Rotary Injection Pump Timing Kit

Transporter and LT models with 2.5SDi/TDi diesel engines require the injection pump to be re-timed as part of the timing belt renewal application.

AST4398G Bosch Pump Timing Tool Kit provides the necessary adaptors and DTL to fit onto the service port located on the pump, between the injection pipes, for establishing static pump timing position.

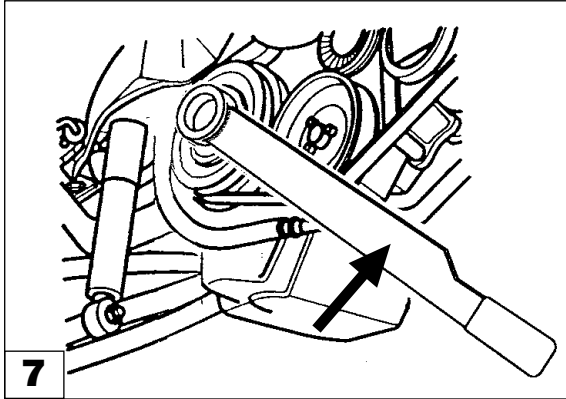
2.5TDi Common Rail Diesel Engines

These VAG 2.5TDi 5 cylinder common rail diesel engines first appeared in 2006 in LT vans and then subsequently in the Crafter van range.

For timing belt replacement on these engines, the AST5038 Set includes a Crankshaft Pulley Holding Tool, Crankshaft Locking Pin, Camshaft Setting Plate and Timing Belt Tensioner Adjuster.

Associated Tools – not included in Set

During the timing belt replacement procedure it is necessary to release the camshaft sprocket off its tapered shaft. The Camshaft Setting Plate MUST NOT be used to counter-hold the camshaft whilst releasing or tightening the sprocket bolt, and therefore Associated Tools AST4848 Sprocket Remover and AST4844 Sprocket Holding Tool are also detailed in these instructions.



AST4438 Crankshaft Pulley Holding Tool

It will be necessary to remove the auxiliary belt, viscous fan, fan cowl and belt pulley.

Remove the camshaft / camshaft cover and upper belt cover, plus remove the guide roller.

AST4438 Holding Tool is used to counter-hold the crankshaft pulley (vibration damper), whilst releasing and tightening the centre bolt

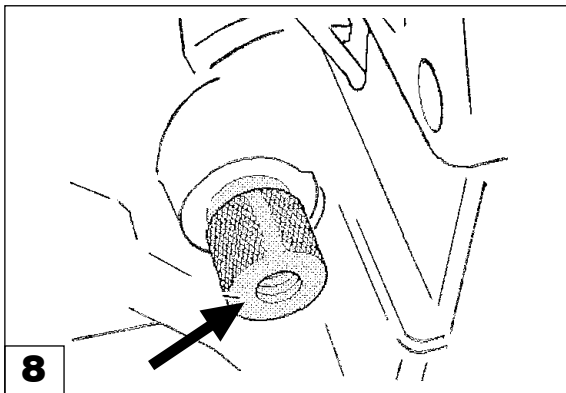
WARNING: The AST4919 Crankshaft Locking Pin MUST NOT be used to counter-hold the crankshaft when releasing / tightening the crankshaft pulley centre bolt –use only AST4438 Holding Tool.

Insert AST4438 Holding Tool in to the crankshaft pulley and loosen the centre bolt, (do not remove pulley at this stage).

Loosen the 4 x pulley securing bolts.

Turn the engine, in the normal direction of engine rotation, to TDC No. 1 cylinder.

Check that the timing mark on the camshaft sprocket aligns with the timing mark on the rear belt cover.



AST4919 Crankshaft Locking Pin

AST4919 Crankshaft Locking Pin

Unscrew the sealing plug from the engine block ready for insertion of the AST4919 Locking Pin.

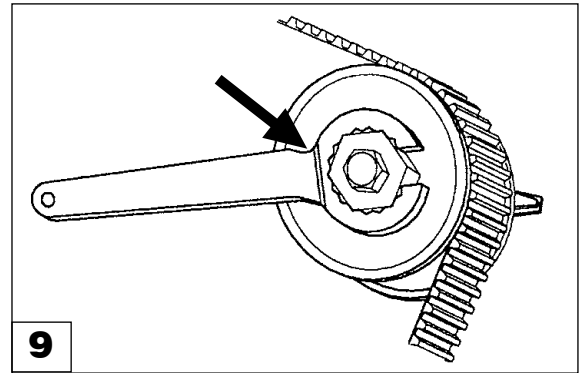
Visually check that the bore to locate the Pin in to the crankshaft is in line with the pin access hole.

Insert AST4919 Locking Pin to retain the crankshaft at TDC No. 1 cylinder. Rock the crankshaft back and forth to ensure it will not rotate and is therefore correctly locked in position.

WARNING: The AST4919 Crankshaft Locking Pin MUST NOT be used to counter-hold the crankshaft when releasing / tightening the crankshaft pulley centre bolt –use only AST4438 Holding Tool.

Unscrew and remove the 4 x crankshaft pulley securing bolts and the centre bolt.

Remove the crankshaft pulley and belt cover.



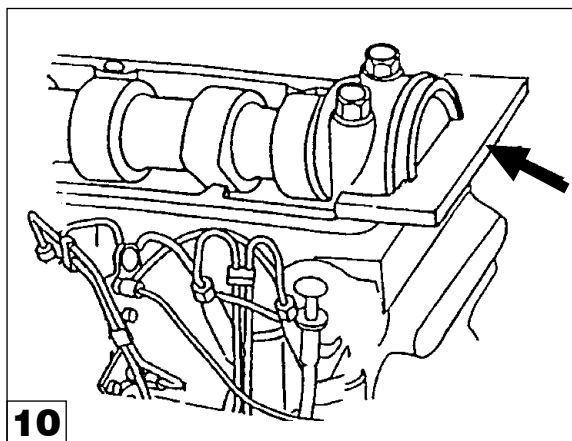
AST4435 Belt Tensioner Adjuster

The AST4435 is a specialised wrench designed for belt tensioner adjustment.

Using AST4435 release the tensioner and relieve tension off the timing belt in order to remove the belt.

Installing a new timing belt

Check that the crankshaft is locked in position with AST4919 Locking Pin.



AST4115A-1 Camshaft Setting Plate

AST4115A-1 Setting Plate is used to accurately align the datum slot, situated in the rear of the camshaft, with the top face of the cylinder head, in order to position the camshaft in the correct timed position.

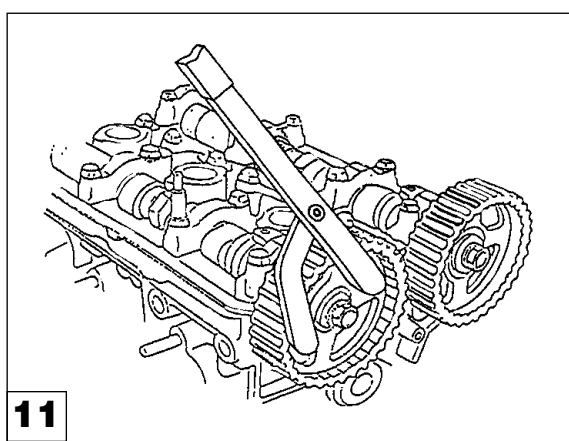
When fitting AST4115A-1 Plate, feeler gauges of equal thickness must be inserted on both sides of the Plate, between the Plate and the surface of the cylinder head, until all free play has been eliminated, as described earlier.

Insert AST4115A-1 Setting Plate into the datum slot. Turn the camshaft so that one side of the Plate touches the surface of the cylinder head.

Using a feeler gauge, measure the gap, which has been created on the opposite side of the head, between Plate and cylinder head.

Insert a feeler gauge equal to half of this gap size, between the Plate and the cylinder head on one side of the head.

Turn the camshaft until the Plate contacts the inserted feeler gauge. Insert a second feeler gauge, of the same size, between the Plate and the cylinder head, on the opposite side of the head, to level the Plate and eliminate any free play.

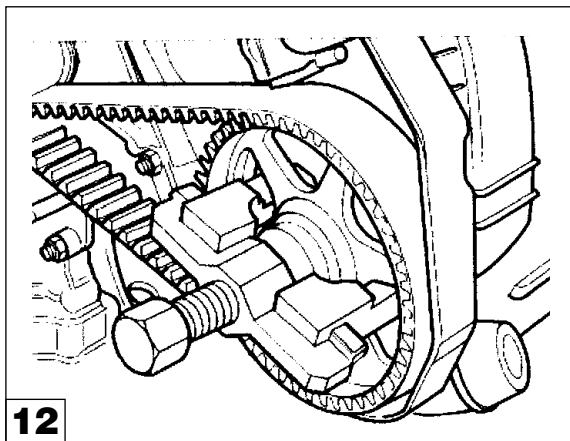


AST4844 Camshaft Sprocket Holding Tool – Associated tool – not in Set

It is necessary to release the camshaft sprocket off its tapered shaft, so it can turn freely, during the timing belt tensioning procedure.

NOTE: The bolt should be released approx. ½ a turn. It should not be fully removed, as it must retain the sprocket on the shaft.

WARNING: AST4115A-1 Camshaft Setting Plate **MUST NOT** be used to counter-hold the camshaft when releasing / tightening the camshaft sprocket retaining bolt. –use a suitable Sprocket Holding Tool such as AST4844.



AST4848 Camshaft Sprocket Remover – Associated tool – not in Set

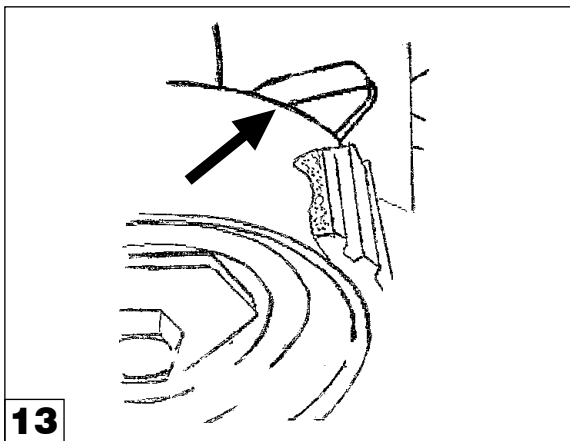
Once the sprocket bolt is released and unscrewed approx ½ a turn, pull the camshaft sprocket off its tapered shaft using Remover AST4848.

Turn the camshaft sprocket so that the timing mark aligns with the timing mark on the rear belt cover.

Tensioning the belt

Ensure that the tensioner roller is installed so that the slotted hole fits over the pin, which protrudes from the lower belt cover.

Fit the new belt and tighten the tensioner bolt finger tight.



To tension the timing belt, fit AST4435 Tensioner Adjuster and **carefully and slowly** turn the tensioner **clockwise** until the **right-hand edge** of the moveable pointer aligns with the **right-hand edge** of the marker – see fig. 13.

WARNING: The right-hand edge of the moveable pointer **MUST NOT** be allowed to pass the right-hand edge of the marker as damage to the tensioner could occur. If the moveable pointer is turned beyond this position, relieve the tension off the tensioner by turning it completely and fully away from the belt. Then, re-apply tension to the belt by turning the tensioner clockwise until the pointer is in the correct position.

Tighten the tensioner bolt to 20Nm.

Using a Sprocket Holding Tool to counter-hold the camshaft sprocket, tighten the sprocket bolt to 100Nm.

Remove the Camshaft Setting Plate and Crankshaft Locking Pin and install the belt cover.

Install the crankshaft pulley and a new centre bolt and washer.

IMPORTANT: The centre bolt threads and contact surfaces must be oiled.

Using AST4438 Crankshaft Pulley Holding Tool, counter-hold the crankshaft pulley whilst tightening the new bolt to 160Nm. + 180 degrees

Tighten the 4 x securing bolts for the crankshaft pulley to 20Nm. + 90 degrees

Turn the crankshaft over, by hand, two turns in the direction of normal engine rotation, and return to the TDC No. 1 cylinder position.

Check the tensioner to ensure that the **right-hand edge** of the moveable pointer is aligned with the **right-hand edge** of the marker. If it is not, the tensioning procedure **MUST** be repeated

Insert AST4919 Crankshaft Locking Pin and check that the timing mark on the camshaft sprocket aligns with the timing mark on the belt cover.



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