AST4830

Diesel Engine Setting/Locking Tool Kit

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.

Applications:

FORD 1.4TDCi, 1.6TDCi, 1.8Di/TDdi/TDCi, 2.0TDCi (Belts).
Timing Belt Replacement Applications on DURATORQ diesel engines in

FORD

Fiesta/Courier	Fusion	Focus
Focus C-Max	Mondeo	S-Max
Galaxy	Tourneo Connect	Transit Connect

MAZDA

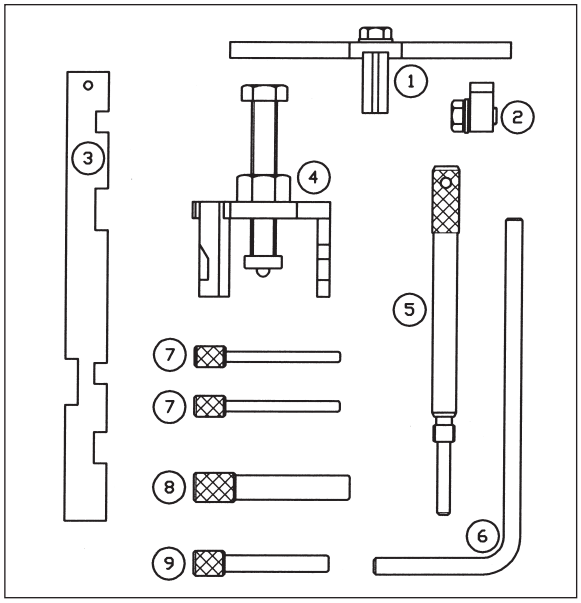
2	3

Refer to the Application Chart on the following page(s) for specific model/engine code information.

The 1.4TDCi and 1.6TDCi diesels are also in Citroen / Peugeot models designated as HDi engines.

Additional AST Tools required:

AST4844 Sprocket Holding Tool



Kit contents/spares

Item	Part Number	Description
1	AST4407	Flywheel Locking Tool
2	AST4834-1	Adaptor for AST4407
3	AST4933	Camshaft Setting Plate
4	AST4408	Camshaft Sprocket Remover
5	AST3026	Crankshaft TDC Location Pin
6	AST4830F6	Flywheel Locking Pin
7	AST4735P15	HP Pump and Crankshaft Locking Pins (2 per Kit)
8	AST4735P16	Flywheel Locking Pin
9	AST4735P17	Camshaft Locking Pin
-	AST4830-84	Case + Insert

AST4830 Application Chart

Models/engines	AST4830 Kit Tools									
	AST 4735P15	AST 4735P16	AST 4735P17	AST 3026	AST 4933	AST 4407	AST 4408	AST 4830F6	AST 4834-1	Additional AST Tools required AST4844 Sprocket Hold
Diesel Engines										
FORD										
1.4TDCi / 1.6TDCi										
Fiesta (02-08) F6JA/F6JB/F6JC – HHJA/HHJB	●	●	●							
Fusion (02-08) F6JA/F6JB/F6JC	●	●	●							
Focus / C-Max (03-08) G8DA/G8DB -HHJA/HHJB	●	●	●							
1.8TDi / TDdi / TDCi										
Fiesta/Courier (00-02) 1.8 Turbo - RTN/RTQ/RTP/C9DC				●	●	●	●			●
Focus / C-Max (98-08) 1.8TDdi/TDCi - FFDA/BHDA/BHDB/C9DA/C9DB/C9DC/KKDA				●	●	●	●			●
Tourneo Connect/Transit Connect (02-06) 1.8TDCi – HPCA/HPCB/P7PA/P9PA/R2PA/R3PA/RWPA/BHPA				●	●	●	●			●
Mondeo (07-08) 1.8TDCi – FFBA/QYBA				●	●	●	●			●
S-Max / Galaxy (06-08) 1.8TDCi – FFWA/QYWA				●	●	●	●			●
2.0TDCi										
Focus / C-Max (03-08) G6DA/G6DB/G6DC			●			●		●	●	
S-Max / Galaxy (06-08) AZWA/QXWA			●			●		●	●	
MAZDA										
2 – 1.4TDCi F6JA	●	●	●							
3 – 1.6TDCi Y6	●	●	●							

AST4830 Diesel Engine Setting/Locking Tool Kit

Comprises: For 1.4TDCi / 1.6TDCi (Belt)

AST4735P15 Crankshaft & Fuel Pump Sprocket Locking Pins x 2

AST4735P16 Flywheel Locking Pin

For locking engine whilst removing and installing crankshaft pulley/bolt

AST4735P17 Camshaft Locking Pin

For 1.8TDi/TDdi/TDCi (Belt)

AST3026 Crankshaft TDC Location Pin

AST4933 Camshaft Setting Plate

AST4407 Flywheel Locking Tool

AST4408 Camshaft Sprocket Remover

For 2.0TDCi (Belt)

AST4830F6 Flywheel Locking Pin

AST4834-1 Adaptor for use with AST4407 Flywheel Locking Tool

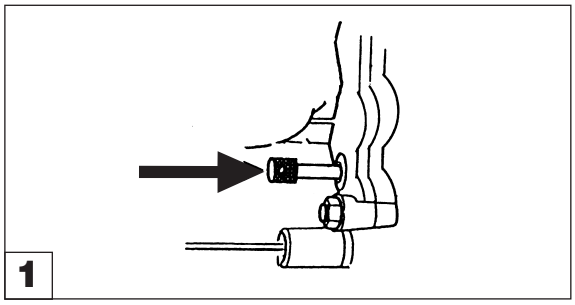
(Also AST4735P17 Pin as detailed in 1.4TDCi/1.6TDCi)

FORD 1.4 and 1.6TDCi Diesel Engines

Ford 1.4TDCi and 1.6TDCi diesels are also in Citroën / Peugeot models designated as HDi engines.

Timing belt replacement on these engines requires the use of **4** Locking Pins.

Remove the RH road wheel and inner wing cover. Move the electrical harness away from the belt upper cover and remove auxiliary belt, upper timing belt cover and the blanking plug in the bell housing where Locking Pin AST4735P16 is to be inserted.



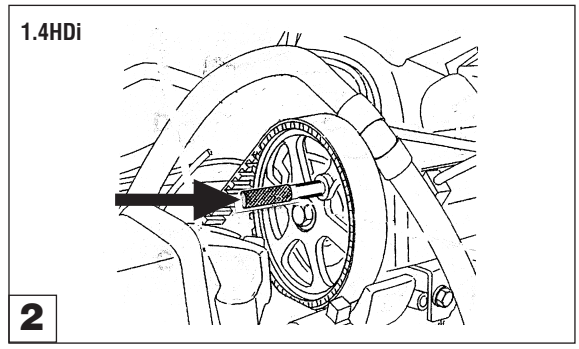
AST4735P16 Flywheel Locking Pin

Rotate the crankshaft until AST4735P16 can be inserted into one of the slots in the flywheel to 'lock' the engine.

Remove the crankshaft pulley, lower timing belt cover, crank position sensor, (check that the magnetic track is not damaged) and belt guide angle bracket.

WARNING Do not touch the magnetic track (sensor ring).

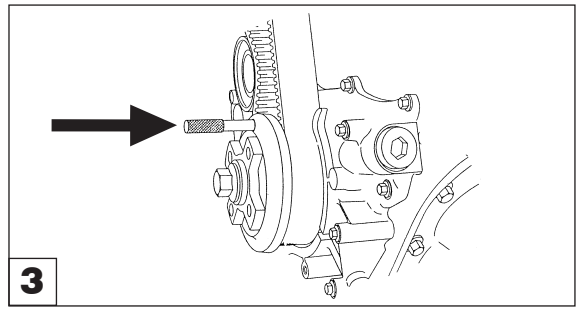
Re-fit the crankshaft pulley bolt (to facilitate engine turning), and remove Locking Pin AST4735P16.



AST4735P17 Camshaft Locking Pin

Turn the engine until the camshaft sprocket timing holes align, and insert Locking Pin AST4735P17.

Check that the crank keyway is in the 11-0-clock position and insert Locking Pin AST4735P15 to confirm correct crankshaft position.



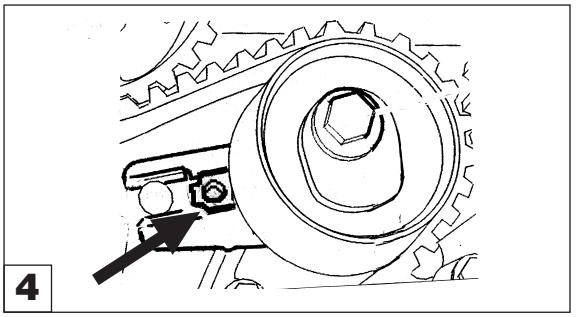
AST4735P15 Crankshaft and Fuel Pump Sprocket Locking Pins (2 in set)

Check that the crankshaft keyway is in the 11-0-clock position and insert Locking Pin AST4735P15 to confirm correct crankshaft position.

One of the AST4735P15 Locking Pins is used to lock the crankshaft and the other one locks the fuel pump sprocket. Check the fuel pump alignment via holes in the pump sprocket. If there is not a corresponding hole in the pump bracket to the hole in the sprocket, then align by positioning the holes in the sprocket vertically.

Support the engine to allow removal of the RH engine mounting/bracket, release the tensioner and remove the old timing belt.

Ensure the camshaft sprocket and crankshaft are locked in timing position with Pins P17 and P15 respectively. Ensure the fuel pump is aligned correctly.



Fit the new timing belt and install the engine mounting/bracket.
Apply tension to the belt by turning the tensioner **anti-clockwise** until the pointer is positioned between the sides of the window.
Re-fit crank position sensor and belt guide angle bracket.

WARNING Do not touch the magnetic track (sensor ring).

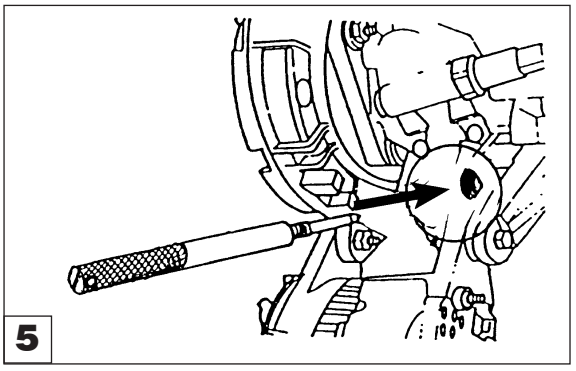
Remove the Locking Pins.
Carefully rotate the crankshaft 10 times **clockwise.**
Check engine timing by ensuring that the camshaft and crankshaft locking pins can be inserted and that the fuel pump sprocket is correctly aligned.
Remove all Locking Pins and check the tensioner pointer is positioned within the window.
Insert Locking Pin P16 into the flywheel and fit the crankshaft pulley using a new centre bolt.

FORD 1.8 TDi/TDdi/TDCi Diesel Engines

This range of Ford diesel started as turbo, direct injection engines and later incorporated common rail technology.

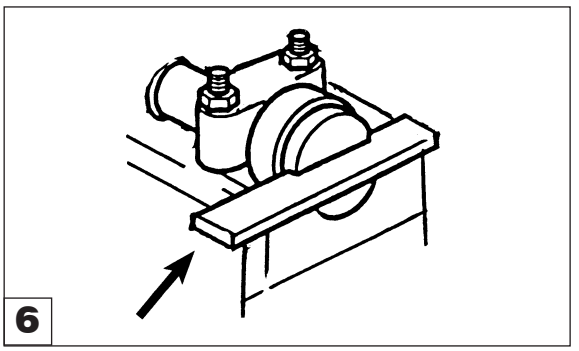
The Endura/Duratorq 1.8 Direct Injection engine utilises a chain drive from the crankshaft to the injection pump and a tooth drive belt from the injection pump to the camshaft.

IMPORTANT: A new belt MUST be installed if the tension has been released from an existing belt.



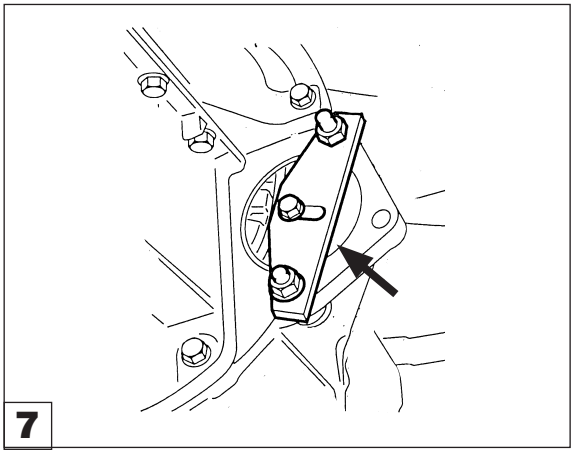
AST3026 Crankshaft TDC Location Pin

This is designed to screw into the cylinder block and provide a stop for the crank web to be positioned against to set the TDC position.
Turn the engine in normal direction of rotation until the slot in the injection pump sprocket is approx. in the 11-o-clock position. Remove the plug from the cylinder block access hole and screw in AST3026.
Slowly and carefully turn the crankshaft **clockwise** until the crankshaft web rests on the Locking Pin. No.1 cylinder is now set at TDC on ignition stroke.



AST4933 Camshaft Setting Plate

On Ford 1.8 diesel engines,**1996 onwards**, AST4933 Setting Plate is used to accurately align an off-centre datum slot in the end of the camshaft with the top face of the camshaft housing, to hold the camshaft in its 'timed' position. A notch is designed into the Setting Plate to accommodate the raised part of the housing.



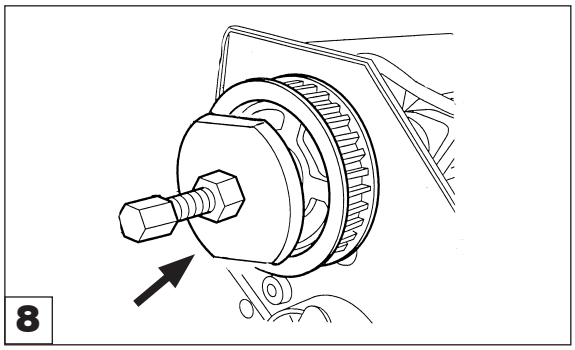
AST4407 Flywheel Locking Tool

For renewal of the camshaft drive belt the crankshaft is located at TDC using the AST3026 Pin but additionally AST4407 Flywheel Locking Tool is fitted as the crankshaft web **MUST** be 'locked' against the AST3026 Pin.

IMPORTANT: Ensure the engine does not move whilst fitting AST4407, and that it engages the flywheel correctly.

Fit the AST4933 Setting Plate into the off-centre slot in the rear of the camshaft.

It will be necessary to support the engine and remove the front engine mounting. The belt tensioner is then slackened and turned **clockwise** away from the belt.

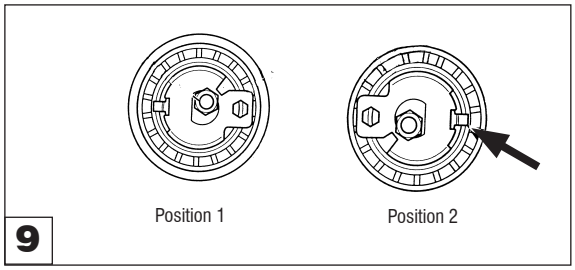


AST4408 Camshaft Sprocket Remover

The camshaft sprocket must be free to turn on its taper.

Using AST4844 Holding Tool the camshaft sprocket bolt is slackened and the sprocket loosened from its taper using AST4408 Remover.

Remove old belt.



When fitting a new belt the automatic tensioner must be in **Position 1**. Fit belt and then turn tensioner **anti-clockwise** until pointer is in **Position 2**.

Counter-hold the camshaft sprocket with AST4844 and tighten the sprocket bolt. Remove all locking tools and rotate the engine six times. Refit crankshaft pin and flywheel locking tool. Check tensioner pointer is in **Position 2** and that the camshaft setting plate can be inserted.

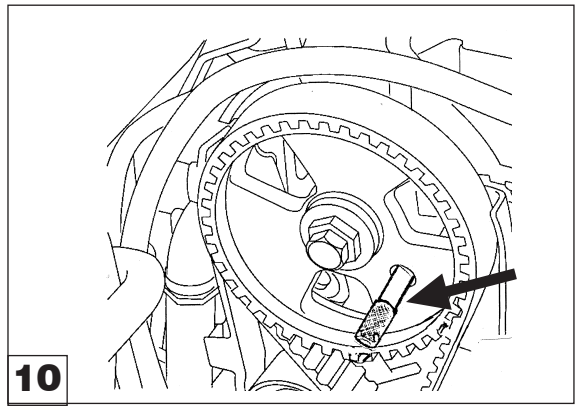
FORD 2.0TDCi (Belt)

Introduced 2003 in the Focus C-Max following an engine development joint venture with PSA (Citroen/Peugeot), these second generation common rail diesels have a camshaft timing belt (unlike the Ford 2.0/2.2/2.4 diesels in Mondeo/Transit which are Chain Drive).

It is necessary to dismantle major components for this belt replacement application including removal of the auxiliary belt, starter motor and coolant expansion tank.

Removal of the upper timing belt cover is straightforward but the crankshaft pulley and CKP sensor will need to be removed prior to removing the lower belt cover.

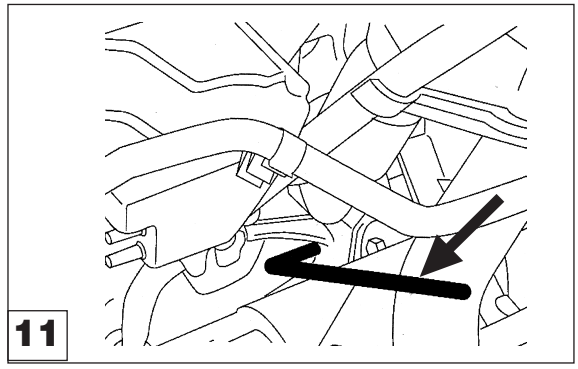
NOTE: The crankshaft must only be turned in the direction of normal rotation.



AST4735P17 Camshaft Locking Pin

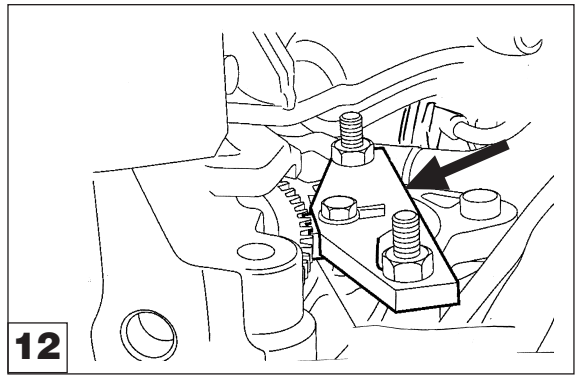
Turn the crankshaft until the timing hole in the camshaft sprocket aligns with the datum hole – 4-o-clock position.

Insert AST4735P17 Camshaft Locking Pin.



AST4830F6 Flywheel Locking Pin

Insert AST4830F6 Locking Pin in to the flywheel to 'set' the crankshaft position prior to 'locking' in place with the Flywheel Locking Tool.



AST4407 Flywheel Locking Tool and AST4834-1 Adaptor

The Flywheel Locking Tool configuration for the 2.0TDCi engine is obtained by using the Main Plate from AST4407 Locking Tool and attaching to it the AST4834-1 Adaptor.

Ensure the Flywheel Locking Tool Assembly is firmly bolted in position where the starter motor is normally fixed and locates on to the Flywheel through the starter motor aperture.

Adjust the Adaptor to 'lock' in to the teeth of the flywheel before firmly bolting in to place, to retain the crankshaft in a fixed position.

Release and remove the crankshaft pulley bolt (do not discard bolt at this stage).

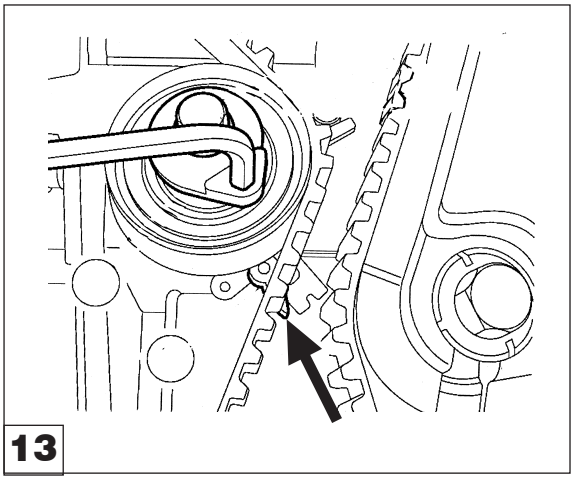
Remove the crankshaft pulley. **WARNING: DO NOT touch the outer sensor ring.**

Remover the tensioner pulley and the old timing belt – **DO NOT** re-fit a used belt.

Installing new timing belt

Install the new belt with the directional arrows in the direction of crankshaft rotation.

Fit new tensioner pulley with its retaining bolt screwed in finger-tight only.



Use an allen key to turn the tensioner **anti-clockwise** to apply tension to the belt.

Check that the tensioner pointer is positioned on the left-side of the tensioner window, and tighten the pulley retaining bolt.

Prepare to re-fit the crankshaft pulley. **WARNING: DO NOT touch the outer sensor ring.**

Use the old pulley centre bolt to install the crankshaft pulley, tighten the bolt to 50Nm.

Remove the AST4830F6 Flywheel Locking Pin and AST4735P17 Camshaft Locking Pin.

Remove the Flywheel Locking Tool.

Turn the crankshaft **4 times**, by hand, in the normal direction of rotation.

Align the timing and datum holes for the camshaft sprocket and insert AST4735P17 Pin.

Insert the AST4830F6 Flywheel Locking Pin and the Flywheel Locking Tool.

Release and remove the crankshaft pulley bolt and discard.

Remove the crankshaft pulley.

Final Tension Position

Use an allen key on the tensioner to maintain tension on the timing belt.

Slacken the tensioner retaining bolt and **position the pointer CENTRALLY** within the window of the tensioner.

Tighten the tensioner bolt.

Install the crankshaft pulley with a new centre bolt and tighten in 2 stages – 70Nm. + 62 degrees.

Remove all tools.

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