

SAFETY NOTICE

To understand the functioning of the tools, it is necessary to read the manual first!

- > Read these instructions before assembling, during installation and throughout use and in the proper sequence
- > Always refer to the OEM manufacturer's instructions and service manuals for the latest data and to maintain the correct sequence
- > These work instructions and the recommended tools are meant to serve as aides only and are by no means a guarantee for certain results.
- > This toolkit is a special collection and it has been tested and used successfully on several occasions. It is of the utmost importance to maintain the correct procedure as per the instructions
- > The use of the tools should only be carried out by qualified personnel!



ATTENTION

Special caution



CORRECT



LIGHT BULB

Hint or recommendation



WRONG



SAFETY GOGGLES

Wearing safety goggles
necessary



1.6dCi 'R9M' Diesel engine in:

RENAULT:

Megane III
Scenic III
Grand
Scenic

Talisman
Espace V
Trafic III

FIAT:

Talento

MERCEDES

BENZ: C180 (205)
C200 (205)
Vito (447)

NISSAN:

Qashqai (J10/
J11) X-Trail (T32)
NV300

OPEL /

VAUXHALL:

Vivaro-B

Engine codes:

R9M40	622.951
2	626.951
R9M40	LWU
4	LWX
R9M40	LWY
8	LWZ

R9M41

0

R9M41

4

R9M450

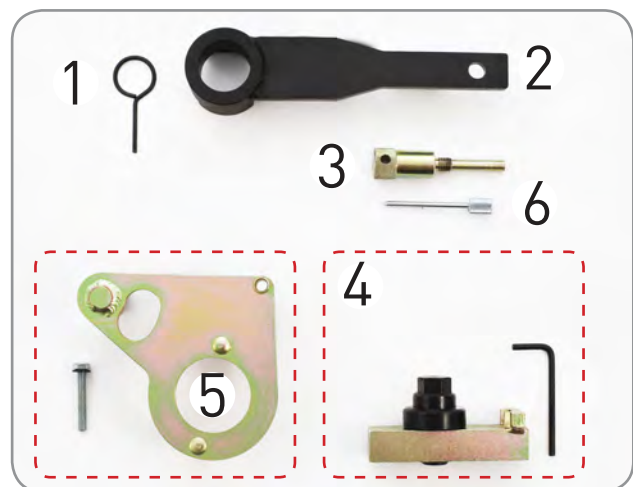
Associated Tools:



4939 Handle - used in conjunction with 4976



Kit Contents / Spares:



Item	Part No.	Description	OE Ref.
1	4975T8	Tensioner Locking Pin	
2	4976	Crankshaft Pulley Holding Tool	MOT.1770
3	5186	Crankshaft Setting Pin	MOT.1970
4	4978	Camshaft Gear Alignment Tool	MOT.1773
5	5187	Camshaft Setting	MOT.1969
6	3032-20	Aux. Belt Tensioner Locking Pin	
-	5185-84	Case + Insert	-

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.

AST has a policy of continuous development & reserve the right to change product specification or appearance without prior notice.

1. INSTRUCTIONS

The Renault derived 1.6dCi 'R9M' diesel engine has similar architecture to the 2.0dCi 'M9R' engine covered by **4975**.

Both engines feature a chain drive between the crankshaft sprocket and exhaust camshaft sprocket. A drive gear is located behind the camshaft chain sprocket, this meshes with a spring loaded split gear fitted to the inlet camshaft.

When replacing the timing chain or adjusting valve timing it is necessary to loosen the belt

If the repair/overhaul procedure being undertaken allows the engine to remain in the vehicle, the engine mount bracket and torque stabiliser may need to be removed from the engine to provide access to engine components. Ensure that the engine is safely supported at all times while the engine mountings are detached.

This instruction assumes that the battery has been disconnected, the inlet and exhaust manifolds and all fuel/ electrical supplies have been detached from the engine, that the engine oil has been drained and that the engine has been removed from the vehicle and the gearbox has been detached.

Engine Timing - Check

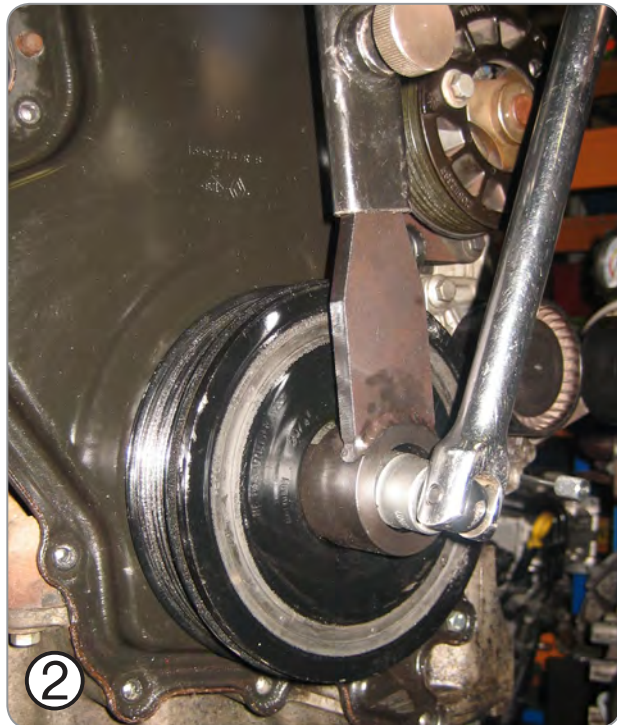
Release the three retaining bolts of the coolant pump pulley by
1/2 a turn.



Do not remove the pulley at this time.

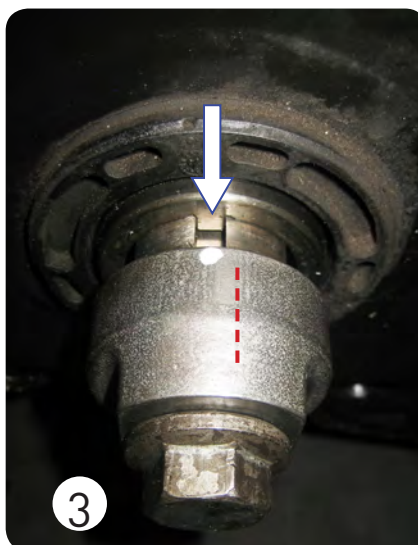
Rotate the auxiliary belt tensioner in a clockwise direction to release tension from the auxiliary belt. Retain the tensioner in position using **3032-20 Auxiliary Belt Tensioner Locking Pin**.

Remove the auxiliary belt from the engine, remove the coolant pump pulley from the engine.



Using **4976 Crankshaft Pulley Holding Tool** in conjunction with **4939 Handle**, counter hold the crankshaft pulley boss. Remove the crankshaft pulley, the pulley boss and the retaining bolt from the engine.

IMPORTANT: Engine setting/locking tools **MUST NOT** be used to counter hold the crankshaft when releasing or tightening the crankshaft pulley bolt.

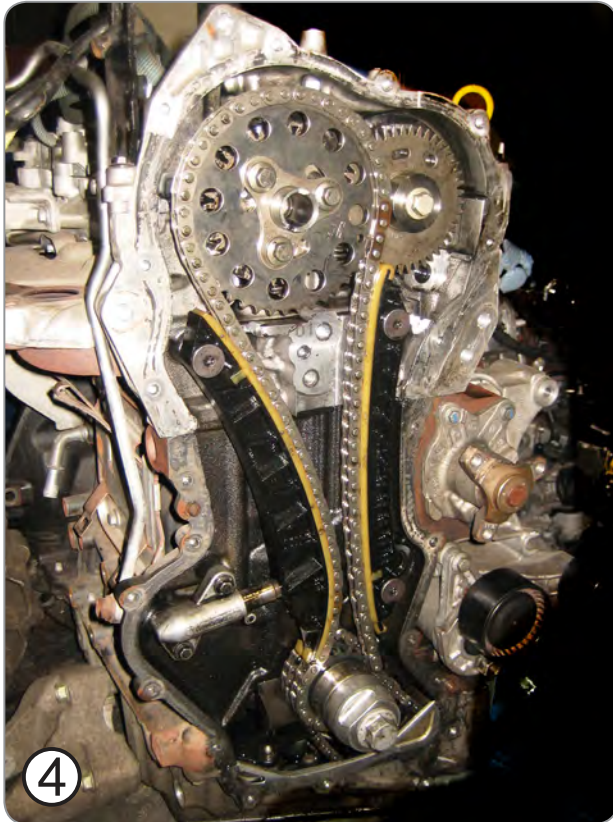


To rotate the crankshaft, the crankshaft pulley boss and retaining bolt need to be reinstalled.

With the crankshaft pulley boss installed, the crankshaft keyway and alignment mark will be obscured.

Make a paint mark on the crankshaft pulley boss in line

with the crankshaft keyway, this will provide a visual reference when rotating the crankshaft to the correct timing position. Refit the crankshaft pulley boss and retaining bolt, finger tight only.



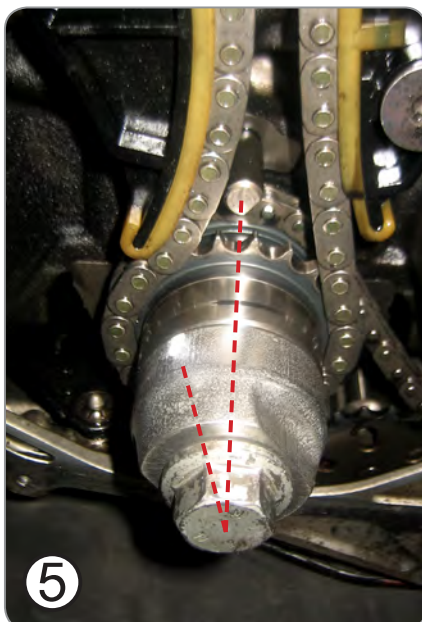
Release the bolts of the timing chain cover and remove the cover from the engine.

Remove all old sealant from the timing chain cover and the engine faces using a plastic scraper.

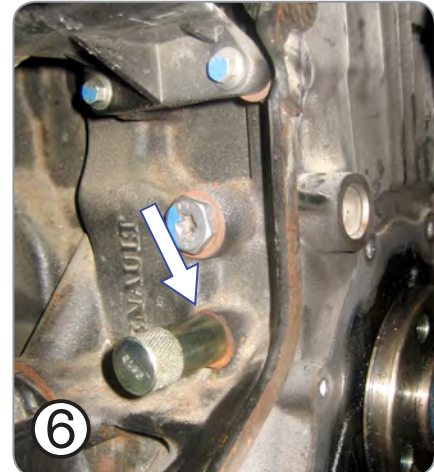
IMPORTANT: Take care not to bend the timing chain cover or damage the sealing face of the engine.

Using **4976 Crankshaft Pulley Holding Tool**

in conjunction with **4939 Handle**, rotate the crankshaft in the normal direction of rotation until the reference mark for the crankshaft keyway is at the 11 o'clock position relative to the centre of the crankshaft.

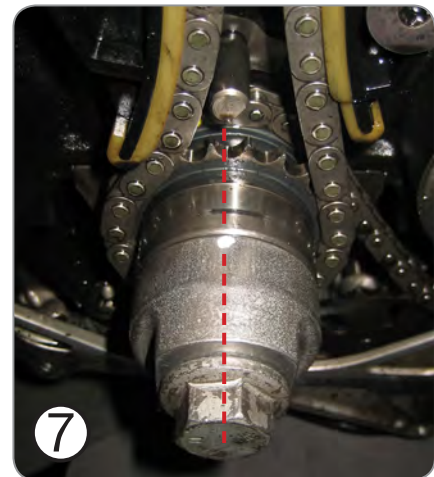


Remove the blanking plug from the engine and install **5186 Crankshaft Locking Pin**, ensuring that it is full located in the thread of the engine.



Rotate the crankshaft in the normal direction of rotation until the crankshaft contacts the end of the pin.

Check that the alignment mark is in line with the peg hole of the engine.



Install **5187 Camshaft Setting Tool** into the slot of the exhaust camshaft and the location holes of the inlet camshaft gear.

Ensure that the crankshaft remains in the correct timing position, contacting **5186 Crankshaft Locking Pin**, when fitting **5187 Camshaft Setting Tool**.

If it is not possible to correctly install **5187 Camshaft Setting Tool** while the crankshaft is set in its 'timed' position, valve timing will require adjustment.

Engine Timing – Adjust

This information assumes that the procedure “Timing – Check” has been carried out correctly, with **5186 Crankshaft Locking Pin** installed in the engine with the web of the crankshaft contacting the end of the locking pin.

WARNING: A level of disassembly is required when carrying out valve timing adjustment. Manufacturer data states that the timing chain assembly including guides, tensioner, chain sprockets, bolts, washers and other related components must be replaced as part of the re-assembly process. Always replace components as recommended by the manufacturer.



If minor re-adjustment of the valve timing is required after reassembly of the engine, for example after the installation of new timing system components, the three bolts of the camshaft sprocket can be loosened by one turn to allow movement of the timing chain sprocket on the exhaust camshaft drive gear.

When the three bolts are released the exhaust camshaft, inlet camshaft and the crankshaft are free to rotate independently of one another.

IMPORTANT: Ensure that the crankshaft remains in the correct timing position, contacting the end of **5186 Crankshaft Locking Pin**, when carrying out timing adjustment procedures.



Install **5187 Camshaft Setting Tool** onto the inlet camshaft and rotate it until it is in the correct timing position with the timing line at approximately 12 o'clock position.

Repeat the process to position the exhaust camshaft, then install **5187 Camshaft Setting Tool** onto both camshafts and retain in position using the bolt provided.

NOTE: The three camshaft sprocket retaining bolts must not be positioned at the end of the slots in the exhaust camshaft drive gear or the camshaft sprocket. If the bolts contact the end of the slots, further disassembly and adjustment of the drive gears will be required. See section “Timing Chain / Drive Gear Replacement”.

Replace the three bolts of the camshaft sprocket and tighten to the manufacturer's specified torque setting.

Remove all setting/locking tools from the engine.

Rotate the crankshaft two full turns in the normal direction of engine rotation.

Repeat the engine timing check procedure detailed on page 2 to ensure correct valve timing has been achieved.

Timing Chain / Drive Gear Adjustment

When removing or installing camshafts during engine overhaul procedures, the timing chain assembly and camshaft drive gears will need to be removed and repositioned.

The following information details the procedure required to remove, install and correctly set the positions of the timing chain and camshaft drive gears.

This information assumes that the procedure "Timing – Check" has been carried out correctly, that the timing chain cover has been removed and that **5186 Crankshaft Locking Pin** is installed in the engine with the web of the crankshaft contacting the end of the locking pin.

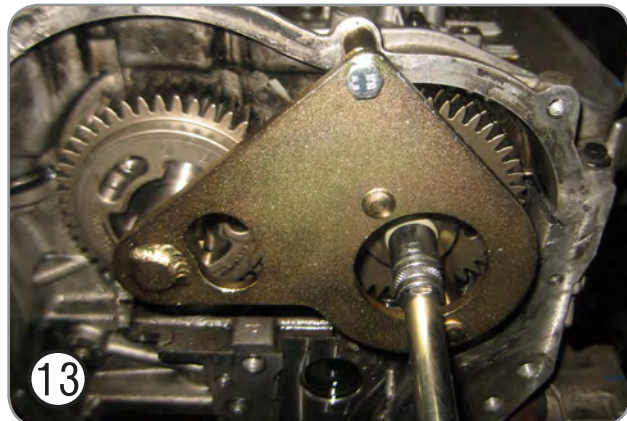


Slowly depress the timing chain tensioner plunger and retain in position using **4975T8 Tensioner Locking Pin**.

Release the retaining screws and remove the timing chain tensioner from the engine.



Remove and discard the timing chain guides, then remove and discard the camshaft sprocket with washer, the crankshaft sprocket and the timing chain.



Install **5187 Camshaft Setting Tool** onto the inlet camshaft and rotate it until it is in the correct timing position with the timing line at approximately 12 o'clock position.

Repeat the process to position the exhaust camshaft, then install **5187 Camshaft Setting Tool** onto both camshafts and retain in position using the bolt provided.

Release the central bolt of the inlet camshaft drive gear but **do not** remove it.

Remove **5187** from the camshafts.



To separate the drive gears and remove them from the camshafts, insert a suitable lever (such as a flat bladed screwdriver) into the aperture of the inlet camshaft drive gear and apply leverage to rotate one half of the split gear.

While maintaining leverage on the split gear, remove the exhaust camshaft drive gear from the engine. With the exhaust camshaft drive gear removed from the engine, the inlet camshaft drive gear can be removed.



To align the split drive gear for installation, use **4978 Camshaft Gear Alignment Tool**.

Install **4978** in the jaws of a bench vice, ensuring that the spindle of the tool is free to rotate.



Locate the inlet camshaft drive gear on to **4978**, ensuring that the of the drive gear key locates in the keyway of the spindle and that the teeth of the gear are located in the teeth of the alignment tool.



Rotate the spindle of the alignment tool in an **anti-clockwise** direction to align the two halves of the split drive gear.

Insert the spacer key provided into the aperture of the split gear to maintain the correct alignment position.

WARNING: DO NOT remove the spacer key from the split drive gear until the drive gear is installed on the engine. The split gear is under spring tension, inadvertently releasing spring tension may result in injury.



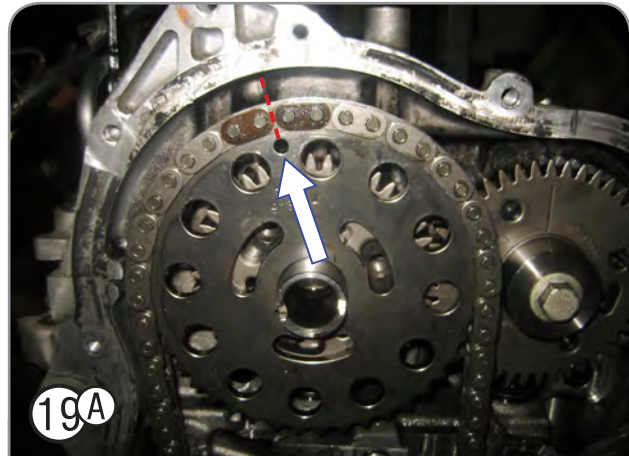
Install the inlet camshaft drive gear and spacer key assembly onto the engine, ensuring that the alignment key of the drive gear locates in the keyway of the camshaft.

Install the inlet drive gear spacer and retaining bolt, finger tight only at this stage.

Install the exhaust drive gear so that the camshaft sprocket bolt holes are approximately central in the elongated slots of the drive gear.

~~Remove the spacer key from the inlet drive gear to activate the spring and 'lock' the drive gears together.~~

NOTE: The timing mark (line) and the keyway of the inlet camshaft should be at the 12 o'clock position. The timing position (slot) of the exhaust camshaft should be approximately horizontal and below the centre line of the camshaft.



Prepare the new timing chain assembly for installation.

Locate and align the coloured links and the timing marks of the camshaft and crankshaft sprockets.

Install the timing chain sprockets and timing chain onto the engine, locating the crankshaft sprocket key in the keyway of the crankshaft.

Install a new crankshaft pulley boss and retaining bolt, finger tight only at this stage.

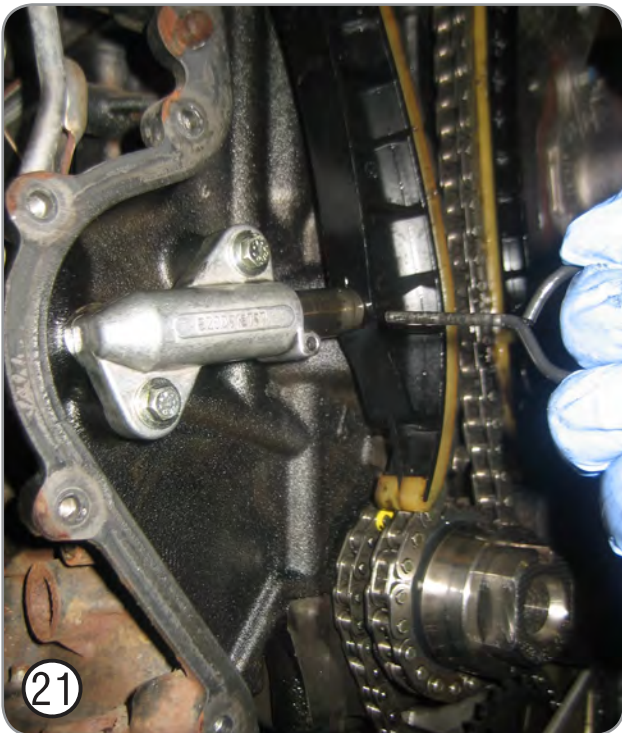
Ensure that the crankshaft is in the correct timing position by attempting to rotate the crankshaft pulley boss in the normal direction of engine rotation.



Install a new camshaft sprocket washer and three new bolts, finger tight only at this stage so that the sprocket is free to rotate on the camshaft.

Install new timing chain guide rails, firstly to the non-tensioned side of the chain assembly, then to the tensioned side.

Tighten the guide rail retaining bolts to the manufacturer's specified torque setting.

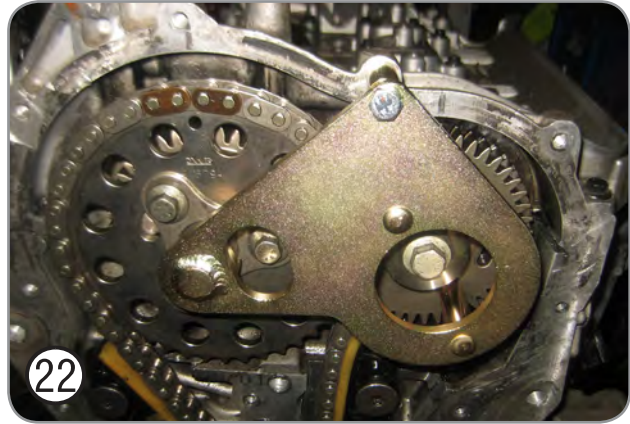


Slowly depress the plunger of the new timing chain tensioner, retain in the retracted position using **4975T8 Tensioner Locking Pin**.

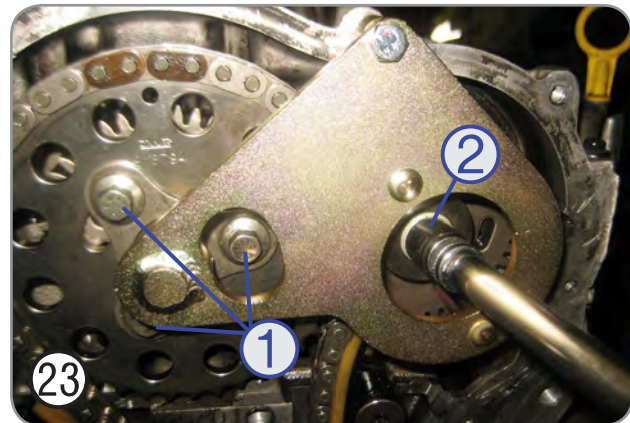
Install the new tensioner on to the engine, tightening the retaining bolts to the manufacturer's specified torque setting.

Remove **4975T8 Tensioner Locking Pin** to activate the plunger and apply tension to the timing chain assembly.

Ensure that the chain and the plunger of the chain tensioner are located at the centre of the timing chain guide rails.



Install **5187 Camshaft Setting Tool** onto the inlet camshaft and exhaust camshaft drive gear and retain in position using the bolt provided.



Tighten the three bolts of the exhaust camshaft sprocket to the manufacturer's specified torque setting, then tighten the central bolt of the inlet camshaft to the manufacturer's specified torque setting. Remove all tools from the engine.

Slowly rotate the crankshaft two full turns in the normal direction of rotation.

Repeat "Engine Timing – Check" procedure detailed on page 2 to ensure that correct engine timing has been achieved.

Reassemble and refit the engine in the reverse order of removal.

IMPORTANT: A small bead of sealant must be applied to the timing chain cover sealing faces on assembly. Take care not to apply excessive sealant as this may be forced into the engine when the retaining bolts of the timing cover are tightened.

NOTE: A new crankshaft pulley boss and central bolt must be fitted at assembly.

NOTES

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